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NATIONAL DAM SAFETY PROGRAM. GOESSLING DAM (MO 30852), MISSOURI--ETC(U)
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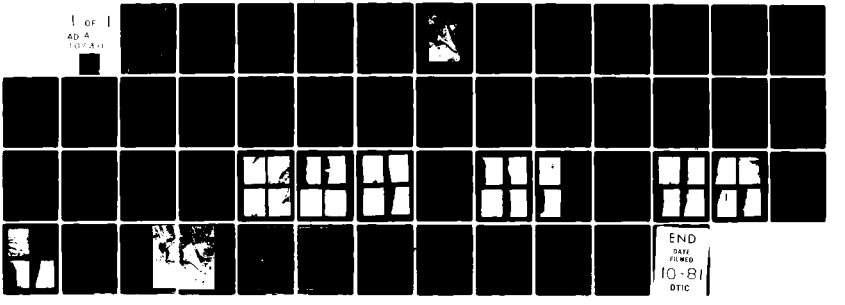


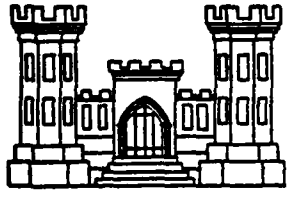
MISSOURI-KANSAS CITY BASIN

GOESSLING DAM

ST. LOUIS COUNTY, MISSOURI

MO 30852

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



PREPARED BY: U. S. ARMY ENGINEER DISTRICT, ST. LOUIS

FOR: STATE OF MISSOURI

NOVEMBER 1978

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A105 311	3. RECIPIENT'S CATALOG NUMBER
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		6. PERFORMING ORG. REPORT NUMBER
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9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Engineer District, St. Louis Dam Inventory and Inspection Section, LMSED-PD 210 Tucker Blvd., North, St. Louis, Mo. 63101		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
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Dam Safety, Lake, Dam Inspection, Private Dams

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report was prepared under the National Program of Inspection of Non-Federal Dams. This report assesses the general condition of the dam with respect to safety, based on available data and on visual inspection, to determine if the dam poses hazards to human life or property.

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DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
210 NORTH 12TH STREET
ST. LOUIS, MISSOURI 63101

IN REPLY REFER TO

SUBJECT: Goessling Dam, MO ID No. 30852
Phase I Inspection Report

This report presents the results of field inspection and evaluation of the Goessling Dam.

It was prepared under the National Program of Inspection of Non-Federal Dams.

This dam has been classified as unsafe, non-emergency by the St. Louis District as a result of the application of the following criteria:

1) Spillway will not pass 25 percent of the Probable Maximum Flood.
2) Overtopping could result in dam failure.
3) Dam failure significantly increases the hazard to loss of life downstream.

SUBMITTED BY: SIGNED
Chief, Engineering Division

18 FEB 1979
Date

APPROVED BY: SIGNED
Colonel, CE, District Engineer

12 FEB 1979
Date

PHASE I REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam	Paul Goessling Dam
State Located	Missouri
County Located	St. Louis County
Stream	Augusta Tavern Creek
Date of Inspection	27 October 1978

The Paul Goessling dam was inspected by an interdisciplinary team of engineers from Reitz & Jens, Inc. under contract with the St. Louis District Corps of Engineers. The purpose of the inspection was to make an assessment of the general condition of the dam with respect to safety, based upon available data and visual inspection, in order to determine if the dam poses hazards to human life or property.

The guidelines used in the assessment were furnished by the Department of the Army, Office of the Chief of Engineers and developed with the help of several Federal and State agencies, professional engineering organizations, and private engineers. Based on these guidelines, this dam is classified as a small dam with a high downstream hazard potential. The estimated zone from failure of the dam extends one mile downstream from the dam.

Failure would threaten the life and property of three families and cause appreciable damage to associated buildings, one county road and one power transmission line.

Our inspection and evaluation indicates that the dam is deficient in that the spillway is inadequate. Considering the small volume of water impounded, the large floodplain downstream and the three groups of farm buildings downstream, one-half Probable Maximum Flood (PMF) is the appropriate spillway design flood. The Probable Maximum Flood is defined as the flood discharge that may be expected from the most severe combination of critical meteorological and hydrologic conditions reasonably possible in the region. A 20% PMF will begin to overtop the dam. The lake and spillway are adequate to contain a 100-year flood which is a flood that has a 1% chance of being equalled or exceeded in any given year.

Other deficiencies noted by the inspection team were tree growth on the upstream and downstream slopes of the dam and lack of erosion protection on the upstream slope and in the spillway of the dam. Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available which is considered a deficiency. A real deficiency to the owner which does not have an adverse effect upon the safety of the dam as evaluated in a Phase I Inspection is the inability to maintain even a reasonably full reservoir.

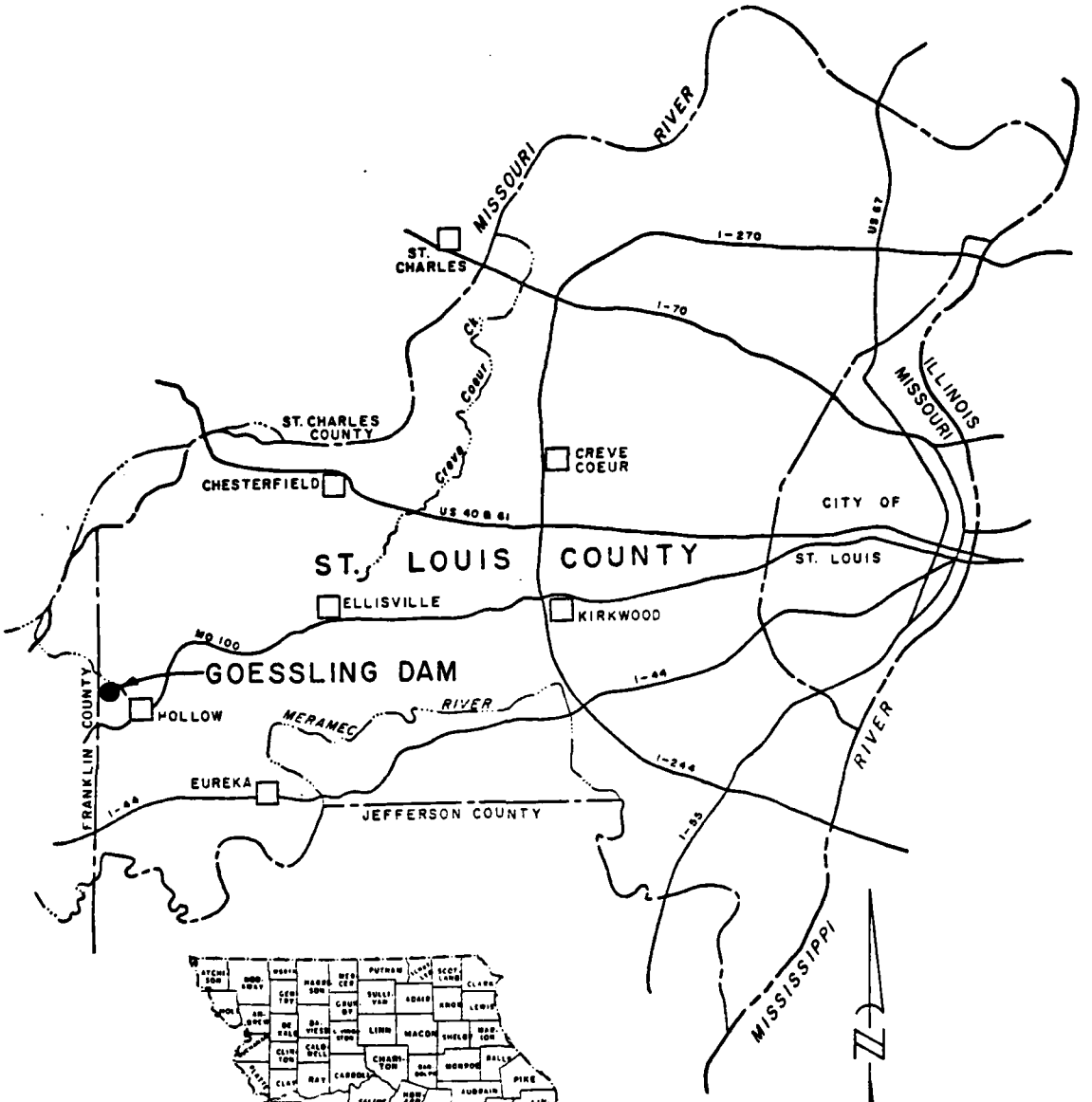
We recommend the owner take action to correct or control the deficiencies described.

HENRY M. REITZ, President
Reitz & Jens, Inc.

JOHN J. BAILEY, JR., Vice President
Chief Engineer
Reitz & Jens, Inc.

OVERVIEW – 30852

PLATE 1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ST. CHARLES
I-270
US 67
I-70
ILLINOIS
MISSOURI
ST. CHARLES COUNTY
Creve Coeur Ck
CREVE COEUR
CHESTERFIELD
US 40 & 61
CITY OF
ST. LOUIS
ST. LOUIS COUNTY
ELLISVILLE
KIRKWOOD
MO 100
GOESSLING DAM
I-44
MERAMEC RIVER
HOLLOW
FRANKLIN COUNTY
EUREKA
JEFFERSON COUNTY
I-55
I-244
MISSISSIPPI RIVER
0 5 10 Miles
LOCATION MAP
MISSOURI
0 100 mi.
VICINITY MAP

PLATE 2

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
Paul Goessling Dam, MO. ID No. 30852

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(Cont.)

LIST OF PLATES

LIST OF INDICES AND PHOTOGRAPH NUMBERS

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority The National Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of safety inspection of dams throughout the United States. Pursuant to the above, the St. Louis District, Corps of Engineers, District Engineer, contracted with Reitz & Jens, Inc. (Contract DACW43-78-C-0162) for a safety inspection of the Paul Goessling Dam, MO. ID No. 30852.

b. Purpose of Inspection The purpose of the inspection was to make an assessment of the general condition of the dam with respect to safety, based upon available data and visual inspection, in order to determine if the dam poses hazards to human life or property.

c. Evaluation Criteria Criteria used to evaluate the dam were furnished by the Department of the Army, Office of the Chief of Engineers, in "Recommended Guidelines for Safety Inspection of Dams". These guidelines were developed with the help of several Federal agencies and many State agencies, professional engineering organizations and private engineers.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances The dam is an earth structure built prior to 1961 in the rolling topography on a tributary of Augusta Tavern Creek.

The soils are Union Silt Loam overlying shallowest bedrock of the lowest strata in the Meramecian Series of the Mississippian System.

The slopes in the watershed are steep in the hillsides and gentle in the valley bottom. Land use in the watershed is about 75% virgin woods and 25% clear and in pasture or lake area. There is an emergency spillway at the west abutment of the dam, an earth channel excavated in virgin soil.

Pertinent physical data are given in paragraph 1.3 below.

Topography in the vicinity of the dam is shown on Plate 3.

b. Location The dam is located in the extreme west of St. Louis County Missouri in the NW¼ of the SW¼ of Section 18, T44N, R3E, as shown on Plate 2. The dam and lake are shown on the Eureka Quadrangle Sheet, 1954 Edition, Revised 1968.

c. Size Classification Criteria for determining the size classification of dams and impoundments are presented in the guidelines referred to in paragraph 1.1.c above. Based on these criteria, this dam and impoundment is in the Small Size Category.

d. Hazard Classification Guidelines for determining hazard classification are presented in the same guidelines referred to in paragraph c above. Based on referenced guidelines, this dam is in the High Hazard Classification.

e. Ownership The dam is owned by Paul Goessling, 17 Upper Ladue Rd., St. Louis, MO, 63124.

f. Purpose of Dam This dam forms a 7.8± acre recreational lake.

g. Design and Construction History The inspection team was unable to find any design data on this dam. It was reported that construction on the dam began in 1954 and water impoundment commenced in 1961.

h. Normal Operating Procedure Normal rainfall, runoff, transpiration and evaporation and seepage from the reservoir all combine to maintain a water surface noticably below the spillway crest. Brush growth on the lake-side slope 10 feet below the spillway crest suggests the lake surface seldom rises above this point. The maximum water depth ever experienced at the spillway is unknown.

1.3 PERTINENT DATA

a. Drainage Area - 154 acres

b. Discharge at Damsite

(1) All discharge at the damsite is through an uncontrolled spillway.

(2) Estimated experienced maximum flood at damsite - unknown.

(3) Estimated ungated spillway capacity at maximum pool elevation - 175 cfs.

c. Elevation (Feet Above M.S.L.)

(1) Top of dam - varies from 633 to 631.8± (see Plate 3).

(2) Spillway crest - 629

(3) Streambed at centerline of dam - 596.6 (est.)

(4) Maximum tailwater - unknown.

d. Reservoir Length of maximum pool - 1,450 feet ±.

e. Storage (Acre-Feet) Top of dam - 191 acre feet.

f. Reservoir Surface (Acres)

(1) Top of dam - 11.9

(2) Spillway crest - 9.6 (est.)

g. Dam

(1) Type - earth embankment

(2) Length - 425 feet

(3) Height - 32 feet maximum (from survey).

(4) Top width - 15 feet

(5) Side Slopes -

(a) Downstream - 1V on 2.9H (determined by survey).

(b) Upstream - 1V on 4H.

(6) Zoning - unknown

(7) Impervious Core - unknown

(8) Cutoff - unknown

(9) Grout curtain - unknown.

h. Diversion and Regulating Tunnel - None

i. Spillways One emergency spillway on the west end.

j. Regulating Outlets - None

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

No design data were found to be readily available (see paragraph 1.2.g).

2.2 CONSTRUCTION

The dam was constructed before 1961.

2.3 OPERATION

The maximum loading on the dam is unknown. The lake level drops from severe leakage into the lake bottom during average precipitation of 38 inches per year.

It appears, from the condition of the emergency spillway, that is has not been used for any sizeable discharge since completion.

2.4 EVALUATION

a. Availability The present owner, who also paid for the original dam construction to create a lake, did not appear to have any records of the design or construction. The owner verbally recollected at least one visit by persons from a public agency.

b. Adequacy The engineering data available were inadequate to make a detailed assessment of design, construction and operation. The owner should have an engineer, experienced in design of dams, perform detailed seepage and stability analyses. An investigation of probable locations, extent and permeability characteristics of waterloss areas in the reservoir is indicated if the owner hopes to maintain a reservoir as originally planned.

However, for the size of dam, materials used and measurements taken, a satisfactory hydrologic/hydraulic evaluation for a full reservoir situation resulted.

c. Validity This report is primarily for safety through maintenance and operation and the conclusions and evaluation for this Phase I Inspection are considered adequate for the definitive statement in this report.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General A visual inspection of the Goessling dam was made on 27 October 1978. This followed two days of field measurements by a survey party on 11 and 14 August 1978. The training and experience of personnel in these inspections included hydraulic/hydrologic engineering, soils and materials engineering, surveying and structural engineering. This section only states those aspects visually observed during the inspection and does not comment upon items reported to have been installed but which were not evident during August and October.

b. Dam The dam is an earth dam. It has a top width of 16 feet (D-2, D-9). Downstream slope is 1V on 3H (D-1); upstream slope is 1V on 3H (D-3, D-11). The height is 32 feet, length approximately 435 feet. The top of dam is essentially level (D-6); elevations vary about one foot. During the field inspections and surveys the water surface in the reservoir was between 15 and 20 feet below the top of the dam (D-3,D-10,D-11,D-12). Both the downstream and upstream surfaces were covered with vegetation (D-1,D-9,D-11,D-12). There was no erosion protection on the reservoir side of the dam (D-3,D-11, D-12). However, the very low lake level reduced the drag of wind blowing across the water; no signs of erosion from waves or other sources on the lake side of the dam were visible. A few saplings were visible on the downstream face of the dam (D-6,D-8), as was some underbrush near the west end (D-1).

On the upstream face of the dam some approximately second-year saplings and underbrush as well as tall weed growth could be seen (D-3,D-11,D-12). These indicate the approximate lake elevations during recent years. The crest of the dam is a heavy luxuriant turf (D-2).

Visual observations for indications of existing seepage were by inspection of the downstream slope of the dam and contiguous areas beyond its toe. No hydrophilic plant growth nor any wet areas were found. While it is apparent that the reservoir has not stayed full or nearly full following wet seasons, the absence of any signs indicating seepage just mentioned can be the direct result of low lake levels. Consequently, the dry downslope portions of the dam with the low reservoir area do not assure freedom from through-seepage or underseepage potentials.

No digging or burrowing animal activity was observed.

c. Spillways There is no primary pipe spillway in the dam. The emergency spillway is at the west end of the dam (S-1,S-4,S-5). The control elevation is about three feet below the top of dam. This spillway is in virgin soil and had a low confining dike (S-3,S-6,S-7) along its east side where, in a part of its alignment, the natural grade was below the nearby top of dam. The spillway has a longitudinal slope of about 3% and is 200 feet long from its high point on the centerline of the dam (S-7). Some very minor erosion paths were visible at the lower end of the spillway that led parallel to the dam downslope (S-2,S-8), rather than following the alignment of the spillway. These, however, appeared to be the result of overland flow from the areas upslope, naturally adjacent to the spillway, rather than from water from the lake going over the spillway.

In the seven weeks between the field survey and dam inspection, the water level in the reservoir dropped two feet. For the very low lake level, the visual impression of shoreline and related conditions in the reservoir would not necessarily be indicative of potential erosion, stability or similar properties. The low lake level, obviously, indicates excessive loss into the bottom of the reservoir. Whether this loss is through the soil mantle or into the shallowest bedrock, it cannot be determined from a Phase I inspection.

d. Reservoir Areas The water storage in the lake is only about one-fourth its capacity (P-1 through P-5).

e. Downstream Channel This channel drains northwardly through a pasture in which there is a horse ring (V-3). Flow over the emergency spillway would reach this channel approximately 100 yards from the centerline of the dam (V-1, V-3).

3.2 EVALUATION

Site observations show a significant problem of loss of water. The site conditions which prevent filling the lake and keeping it nearly full except for abstractions due to evaporation, prevent assessment of potential seepage and bank erosion. Erosion of the bottom of the emergency spillway with aggravated discharge resulting is recognized as a probability.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

There are no controlled outlet works for this dam; therefore, no regulating procedures exist. The pool is controlled by rainfall, runoff, evaporation, seepage into the reservoir sides and bottom, and capacity of the uncontrolled spillway.

4.2 MAINTENANCE OF DAM

Based on the amount of brush and size of saplings on the slopes, these have not had brush cut yearly. The spillway has no erosion protection.

4.3 MAINTENANCE OF OPERATING FACILITIES

No operating facilities exist at this dam.

4.4 DESCRIPTION OF ANY WARNING SYSTEM IN EFFECT

The inspection team is not aware of any existing warning system for this dam.

4.5 EVALUATION

The potential hazards from this dam result from the deficient capacity of its emergency spillway as discussed in section 5.1.d.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data No design data are available.

b. Experience Data The drainage area is developed from USGS Eureka Missouri Quadrangle. Also available are 1"=2000' aerial stereo pairs taken on 9 April 1977, by Surdex Corporation. The lake area is measured on a 1"=200' enlargement of a portion of one of these photographs and shown on Plate 1. The spillway and dam layout are from surveys made during the inspection.

c. Visual Observations

1) The spillway and exit channel are located at the southwest end of the dam. Spillway has a bottom width of about 20 feet, 1V to 10H side slopes and is about two feet deep.

2) No drawdown facilities are available to evacuate the pool.

3) Maximum spillway releases may endanger the integrity of the dam (see paragraph 3.2).

d. Overtopping Potential

1) Although the lake seems to remain well below spillway elevation, prudent engineering analysis requires that spillway capacities be evaluated on the basis of a reservoir full to the spillway crest. On this basis the spillways are too small to pass the minimum required flood of the probable maximum without overtopping. The probable maximum flood is defined as the flood discharge expected from the most severe combination of critical meteorological and hydrologic conditions reasonably possible in the region. The dam will start to be overtopped by a flood equal to 20% of the PMF. The PMF will overtop the dam to a maximum depth of about 1.2 feet. The depth will vary to zero across the dam because of the sloping crest. A width of 300 feet of dam crest will be subject to some overtopping flow. Maximum rate of flow over the dam crest will be subject to some overtopping flow. Maximum rate of flow over the dam crest will be about 500 cubic feet per second. Overtopping flow will have a duration of about 2 hours. The existing lake and spillway will contain a 100-year frequency flood below the crest of the dam.

According to the recommended guidelines from the Department of the Army, Office of the Chief of Engineers, the 100-year frequency flood is only adequate for a low hazard dam of small size.

2) At the current pool elevation 14.1 feet below the spillway crest, the lake has capacity to retain a one-day 100-year flood without reaching the spillway crest. Assuming a start at the current pool elevation, overtopping of the dam would begin to occur for a flood equal to 35% of the one-day PMF. Because a drawdown tube is absent, there is no assurance the pool will remain at the current elevation. In the future, it is possible that the reservoir will be full at the beginning of a period of intense rainfall. Therefore, the statements in this paragraph cannot justify the lack of adequate spillways but can be used to evaluate the urgency for necessary correction.

3) The effect from rupture of the dam could extend approximately one mile downstream of the dam. There are three inhabited homes downstream of the dam which could be severely damaged and lives of the inhabitants could be lost should failure of the dam occur. A county road and power transmission line are also in the damage zone.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations Visual observations which adversely affect the structural stability of this dam are discussed in Section 3, paragraph 3.1.b.

b. Design and Construction Data No design or construction data relating to the structural stability of the dam were found.

c. Operating Records No appurtenant structures requiring operation exist at this dam.

d. Post Construction Changes No post construction changes, other than those referred to in a above, exist which will affect the structural stability of the dam.

e. Seismic Stability Considering the seismic zone (2) in which this dam is located, an earthquake of this magnitude is not expected to cause a structural failure of this dam.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety The spillway is inadequate to pass the required one-half Probable Maximum Flood (PMF). The dam will begin to be overtopped by a flood of 20 percent of the PMF.

The reservoir and principal spillway are adequate to contain a flood which has a 1% chance of being exceeded (100-year flood) in any given year.

Several items were noted during visual inspection by the inspection team which should be corrected or controlled. The growth of trees on the upstream and downstream slopes of the dam is a safety deficiency. An armor-coat to protect the reservoir slope of the dam against wave-wash is needed. Erosion protection for the spillway is deficient. However, none of these is of serious concern until the degree of leakage from the reservoir is substantially reduced.

The stability of and seepage conditions on the downstream slope should be investigated within the first season by an engineer experienced in design of dams after the reservoir leakage is substantially reduced.

b. Adequacy of Information Due to the lack of engineering design and construction data, the conclusions in this report were based on performance history and external visual conditions. The inspection team considers these data sufficient to support the conclusions herein. Seepage and stability analyses comparable to the requirements of the "Recommended Guidelines for Safety Inspection of Dams" were not available, which is considered a deficiency.

c. Urgency The remedial measures recommended in paragraph 7.2 should be accomplished in the near future.

d. Necessity for Phase II Based on the results of the Phase I Inspection, no Phase II Inspection is recommended.

e. Seismic Stability This dam is located in seismic zone 2. An earthquake of this magnitude is not expected to be hazardous to this dam.

7.2 REMEDIAL MEASURES

a. The leakage from the reservoir does not adversely affect the stability of the dam. Therefore, remedial measures are not a requirement of a Phase I report. The inability to maintain a lake level as desired is a definite (but separate from Phase I hazard assessment) concern to the owner.

b. Stability and Seepage Analyses The owner should have an engineer experienced in design and construction of dams prepare seepage and stability analyses.

c. O&M Maintenance and Procedures The following O&M maintenance and procedures are recommended:

(1) Spillway size and/or height of dam should be increased to pass the 50 percent PMF. In either case, the spillway should be protected to prevent erosion.

(2) Remove vegetation growth on the downstream slope of the dam.

(3) After removal of existing tree growth, vegetation on the dam should be periodically cut.

(4) Control growth of vegetation on the dam.

(5) Fill, grade, fertilize, seed and mulch the erosion channels on the downstream slope. If these are allowed to continue to erode, eventual sloughing and sliding of the downstream face of the dam may occur.

(6) Build and maintain an erosive-resistant sill in the control section of the spillway and remove the humps and irregularities in the spillway channel.

(7) A detailed inspection of the dam should be made periodically by an engineer experienced in design and construction of dams. Records should be kept of these inspections and major maintenance.

(8) The slope of the dam on the reservoir side should be protected against erosion.

APPENDIX A

HYDROLOGIC COMPUTATIONS

HYDROLOGIC AND HYDRAULIC ANALYSIS METHODOLOGY

1. The hydrologic analysis used in development of the overtopping potential is based on applying a hypothetical storm to a unit hydrograph to obtain the inflow hydrograph for a reservoir routing. The Probable Maximum Precipitation for those dams in the high hazard potential category is derived and determined from regional charts prepared by the National Weather Service in "Hydrometeorological Report No. 33". Reduction factors have not been applied. A 24-hour storm duration is assumed with the 24-hour rainfall depths distributed over 6-hour periods in accordance with procedures outlined in EM 1110-2-1411 (SPF Determination). The maximum 6-hour rainfall period is then distributed to hourly increments by the same criteria. Within-the-hour distribution is based upon NOAA Technical Memorandum NWS HYDRO-35. The non-peak 6-hour rainfall periods are distributed uniformly. All distributed values are arranged in a critical sequence by the SPF criteria. The final inflow hydrograph is produced by deduction of infiltration losses appropriate to the soil, land use and antecedent moisture conditions.

2. The reservoir routing is accomplished by using Modified Puls routing techniques wherein the flood hydrograph is routed through lake storage. Hydraulic capacities of the outlet works, spillway and crest of dam are used as outlet controls in the routing. Storage in the pool area is defined by an elevation-area curve. The hydraulic capacity of the spillways is defined by an elevation-discharge curve. The hydraulic capacity of the sloping top of dam is defined by a triangular broad-crested weir equation.

3. Dam overtopping analysis has been conducted by hydrologic methods for this dam and lake. This computation determines the percentage of the PMF hydrograph that the reservoir can contain without the dam being overtopped. An output summary in the hydrologic appendix displays this information as well as other characteristics of the simulated dam overtopping.

4. The above methodology has been accomplished for this report using the systemized computer program HEC-1 (Dam Safety Version), July 1978, prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California. The numeric parameters estimated for this site are listed on Plate 1A. Definitions of these variables are contained in the "User's Manual" for the computer program.

5. The discharge in the spillway was calculated using critical depth at the control section near where the dam centerline crosses the spillway channels, allowing 0.2 velocity head for non-uniform velocity distribution, velocity transition losses and friction in the short approach channel. This is equivalent to calculating the spillway as a broad-crested weir with a discharge coefficient of 2.80.

6. The average longitudinal slope of top of dam was determined by plotting length of crest subject to overflow for incremental increases in lake elevation above the lowest crest elevation. The "Z" value thus obtained (increase in lineal feet of crest subject to overflow per foot of rise in the lake) was then used in the triangular broad-crested weir equation: Q = C*0.4*Z*H**2.5.

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FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  3 AUG 78
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    1                 A   ********** ID # 30852 PAUL GOESSLING DAM ** ADD 515 FOR USGS ELEV *
    2                 A   ********** DAM SAFETY PROGRAM - U. S. CORPS OF ENGINEERS **********
    3                 A   ********** REIT7 @ JENS. INC. -     AUGUST 1978 **********************
    4                 B     288        0         5        -0        -0        -0        -0        -0        -4        -0
    5                 I       5
    6                 J       1         9         1
    7                 J1   0.10      0.15      0.20      0.25      0.30      0.35      0.40      0.50      1.00
    8                 K       0         1                             1         3         1
    9                 1   ***** INFLOW HYDROGRAPH - SCS METHOD *****
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   11                 P              24.8       101       120       130
   12                 T                                                                -1       -80                  0.03
   13                 W2             0.20
   14                 X             -0.10       2.0
   15                 K       1        09                             1                 1
   16                 1   ***** RESERVOIR ROUTING - RATING CURVE SUPPLIED - SLOPING DAM *****
   17                 Y                                          1         1
   18                 Y1      1                                                    -114.1        -1
   19                 Y4  114.1     114.5     115.0     115.5     116.0     116.5     117.0     117.5     118.0     118.5
   20                 Y4  119.0     119.5
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   25                 $$  114.1
   26                 $D  116.4       3.0       2.5        96
   27                 K       99
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TABLE A-1
Sheet 1 of 5

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**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  3 AUG 78
**********

RUN  DATE= 10/02/78.
     TIME= 11.50.36.


                * ********** ID # 30852 PAUL GOESSLING DAM ** ADD 515 FOR USGS ELEV *
                 ********** DAM SAFETY PROGRAM - U. S. CORPS OF ENGINEERS **********
                 ********** RETTZ & JENS, INC. -    AUGUST 1978 **********

                                    JOB SPECIFICATION
                  NQ      NHR     NMIN     IDAY      IHR     IMIN    METRC     IPLT     IPRT    NSTAN
                 288       0        5       -0       -0       -0       -0       -0       -4       -0
                                   JOPER      NWT    LROPT    TRACE
                                       5       -0       -0       -0


                                MULTI-PLAN ANALYSES TO BE PERFORMED
                                     NPLAN= 1 NRTIO= 9 LRTIO= 1
                     RTIOS=     .10     .15     .20     .25     .30     .35     .40     .50    1.00


          **********          **********          **********          **********          **********

                                    SUB-AREA RUNOFF COMPUTATION

               ***** INFLOW HYDROGRAPH - SCS METHOD *****
                             ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 1       0      -0      -0       1       3       1      -0      -0

                                          HYDROGRAPH DATA
                   IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                       1       2     .24   -0.00     .24    1.00  -0.000      -0       1      -0

                                          PRECIP DATA
                            SPFE     PMS      R6     R12     R24     R48     R72     R96
                           -0.00   24.80  101.00  120.00  130.00   -0.00   -0.00   -0.00

                                          LOSS DATA
                    LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                       -0   -0.00   -0.00    1.00   -0.00   -0.00    1.00   -1.00  -80.00   -0.00     .00

                    CURVE NO =  -80.00  WETNESS =   -1.00  EFFECT CN =   80.00

                                     UNIT HYDROGRAPH DATA
                                   TC= -0.00    LAG=   .20

                                     RECESSION DATA
                                STRTQ=   -0.00    QRCSN=    -.10    RTIOR= 2.00

                UNIT HYDROGRAPH 14 END OF PERIOD ORDINATES, TC= 1 -0.00 HOURS, LAG=    .20  VOL= 1.00
                  117.      386.      478.      382.      213.      122.       69.       40.       23.       13.
                    7.        4.        2.        1.

                0                                 END-OF-PERIOD FLOW
           MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q       MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q
```

TABLE A-1
Sheet 2 of 5

0 MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.05	1	.01	.00	.01	0.	1.01	12.05	145	.21	.19	.02	124.
1.01	.10	2	.01	.00	.01	0.	1.01	12.10	146	.21	.19	.02	174.
1.01	.15	3	.01	.00	.01	0.	1.01	12.15	147	.21	.19	.02	236.
1.01	.20	4	.01	.00	.01	1.	1.01	12.20	148	.21	.19	.02	287.
1.01	.25	5	.01	.00	.01	1.	1.01	12.25	149	.21	.19	.02	316.
1.01	.30	6	.01	.00	.01	1.	1.01	12.30	150	.21	.19	.02	333.
1.01	.35	7	.01	.00	.01	1.	1.01	12.35	151	.21	.19	.02	343.
1.01	.40	8	.01	.00	.01	1.	1.01	12.40	152	.21	.19	.01	350.
1.01	.45	9	.01	.00	.01	1.	1.01	12.45	153	.21	.19	.01	354.
1.01	.50	10	.01	.00	.01	1.	1.01	12.50	154	.21	.20	.01	357.
1.01	.55	11	.01	.00	.01	1.	1.01	12.55	155	.21	.20	.01	360.
1.01	1.00	12	.01	.00	.01	1.	1.01	13.00	156	.21	.20	.01	361.
1.01	1.05	13	.01	.00	.01	1.	1.01	13.05	157	.25	.24	.01	367.
1.01	1.10	14	.01	.00	.01	1.	1.01	13.10	158	.25	.24	.01	384.
1.01	1.15	15	.01	.00	.01	1.	1.01	13.15	159	.25	.24	.01	404.
1.01	1.20	16	.01	.00	.01	1.	1.01	13.20	160	.25	.24	.01	420.
1.01	1.25	17	.01	.00	.01	1.	1.01	13.25	161	.25	.24	.01	429.
1.01	1.30	18	.01	.00	.01	1.	1.01	13.30	162	.25	.24	.01	435.
1.01	1.35	19	.01	.00	.01	1.	1.01	13.35	163	.25	.24	.01	439.
1.01	1.40	20	.01	.00	.01	1.	1.01	13.40	164	.25	.24	.01	441.
1.01	1.45	21	.01	.00	.01	1.	1.01	13.45	165	.25	.24	.01	443.
1.01	1.50	22	.01	.00	.01	1.	1.01	13.50	166	.25	.24	.01	445.
1.01	1.55	23	.01	.00	.01	1.	1.01	13.55	167	.25	.24	.01	446.
1.01	2.00	24	.01	.00	.01	1.	1.01	14.00	168	.25	.24	.01	447.
1.01	2.05	25	.01	.00	.01	1.	1.01	14.05	169	.31	.30	.01	455.
1.01	2.10	26	.01	.00	.01	1.	1.01	14.10	170	.31	.30	.01	479.
1.01	2.15	27	.01	.00	.01	1.	1.01	14.15	171	.31	.30	.01	508.
1.01	2.20	28	.01	.00	.01	1.	1.01	14.20	172	.31	.30	.01	532.
1.01	2.25	29	.01	.00	.01	1.	1.01	14.25	173	.31	.30	.01	546.
1.01	2.30	30	.01	.00	.01	1.	1.01	14.30	174	.31	.30	.01	554.
1.01	2.35	31	.01	.00	.01	1.	1.01	14.35	175	.31	.30	.01	559.
1.01	2.40	32	.01	.00	.01	1.	1.01	14.40	176	.31	.31	.01	562.
1.01	2.45	33	.01	.00	.01	1.	1.01	14.45	177	.31	.31	.01	564.
1.01	2.50	34	.01	.00	.01	1.	1.01	14.50	178	.31	.31	.01	566.
1.01	2.55	35	.01	.00	.01	1.	1.01	14.55	179	.31	.31	.01	567.
1.01	3.00	36	.01	.00	.01	1.	1.01	15.00	180	.31	.31	.01	567.
1.01	3.05	37	.01	.00	.01	1.	1.01	15.05	181	.19	.19	.00	554.
1.01	3.10	38	.01	.00	.01	1.	1.01	15.10	182	.38	.37	.01	530.
1.01	3.15	39	.01	.00	.01	1.	1.01	15.15	183	.38	.37	.01	545.
1.01	3.20	40	.01	.00	.01	1.	1.01	15.20	184	.57	.56	.01	611.
1.01	3.25	41	.01	.00	.01	1.	1.01	15.25	185	.67	.65	.01	740.
1.01	3.30	42	.01	.00	.01	1.	1.01	15.30	186	1.62	1.59	.02	1001.
1.01	3.35	43	.01	.00	.01	2.	1.01	15.35	187	2.67	2.63	.03	1615.
1.01	3.40	44	.01	.00	.01	2.	1.01	15.40	188	1.05	1.04	.01	2362.
1.01	3.45	45	.01	.00	.01	2.	1.01	15.45	189	.67	.66	.01	2605.
1.01	3.50	46	.01	.00	.01	2.	1.01	15.50	190	.57	.57	.01	2310.
1.01	3.55	47	.01	.00	.01	3.	1.01	15.55	191	.38	.38	.00	1813.
1.01	4.00	48	.01	.00	.01	3.	1.01	16.00	192	.38	.38	.00	1413.
1.01	4.05	49	.01	.00	.01	3.	1.01	16.05	193	.29	.29	.00	1116.
1.01	4.10	50	.01	.00	.01	3.	1.01	16.10	194	.29	.29	.00	899.
1.01	4.15	51	.01	.00	.01	4.	1.01	16.15	195	.29	.29	.00	754.
1.01	4.20	52	.01	.00	.01	4.	1.01	16.20	196	.29	.29	.00	661.
1.01	4.25	53	.01	.00	.01	4.	1.01	16.25	197	.29	.29	.00	608.
1.01	4.30	54	.01	.00	.01	4.	1.01	16.30	198	.29	.29	.00	579.
1.01	4.35	55	.01	.00	.01	5.	1.01	16.35	199	.29	.29	.00	561.
1.01	4.40	56	.01	.00	.01	5.	1.01	16.40	200	.29	.29	.00	549.
1.01	4.45	57	.01	.00	.01	5.	1.01	16.45	201	.29	.29	.00	543.
1.01	4.50	58	.01	.00	.01	5.	1.01	16.50	202	.29	.29	.00	541.
1.01	4.55	59	.01	.00	.01	5.	1.01	16.55	203	.29	.29	.00	540.
1.01	5.00	60	.01	.00	.01	6.	1.01	17.00	204	.29	.29	.00	539.

TABLE A-1
Sheet 3 of 5

1.01	5.05	61	.01	.00	.01	6.	1.01	17.05	205	.23	.23	.00	532.
1.01	5.10	62	.01	.00	.01	6.	1.01	17.10	206	.23	.23	.00	508.
1.01	5.15	63	.01	.00	.01	6.	1.01	17.15	207	.23	.23	.00	478.
1.01	5.20	64	.01	.00	.01	6.	1.01	17.20	208	.23	.23	.00	454.
1.01	5.25	65	.01	.00	.01	6.	1.01	17.25	209	.23	.23	.00	441.
1.01	5.30	66	.01	.00	.01	7.	1.01	17.30	210	.23	.23	.00	434.
1.01	5.35	67	.01	.00	.01	7.	1.01	17.35	211	.23	.23	.00	429.
1.01	5.40	68	.01	.00	.01	7.	1.01	17.40	212	.23	.23	.00	427.
1.01	5.45	69	.01	.00	.01	7.	1.01	17.45	213	.23	.23	.00	426.
1.01	5.50	70	.01	.00	.01	7.	1.01	17.50	214	.23	.23	.00	425.
1.01	5.55	71	.01	.00	.01	8.	1.01	17.55	215	.23	.23	.00	424.
1.01	6.00	72	.01	.00	.01	8.	1.01	18.00	216	.23	.23	.00	424.
1.01	6.05	73	.07	.02	.04	10.	1.01	18.05	217	.02	.02	.00	400.
1.01	6.10	74	.07	.02	.04	17.	1.01	18.10	218	.02	.02	.00	320.
1.01	6.15	75	.07	.03	.04	27.	1.01	18.15	219	.02	.02	.00	253.
1.01	6.20	76	.07	.03	.04	35.	1.01	18.20	220	.02	.02	.00	237.
1.01	6.25	77	.07	.03	.04	41.	1.01	18.25	221	.02	.02	.00	221.
1.01	6.30	78	.07	.03	.04	46.	1.01	18.30	222	.02	.02	.00	206.
1.01	6.35	79	.07	.03	.03	50.	1.01	18.35	223	.02	.02	.00	192.
1.01	6.40	80	.07	.03	.03	53.	1.01	18.40	224	.02	.02	.00	179.
1.01	6.45	81	.07	.03	.03	56.	1.01	18.45	225	.02	.02	.00	167.
1.01	6.50	82	.07	.04	.03	59.	1.01	18.50	226	.02	.02	.00	156.
1.01	6.55	83	.07	.04	.03	61.	1.01	18.55	227	.02	.02	.00	146.
1.01	7.00	84	.07	.04	.03	63.	1.01	19.00	228	.02	.02	.00	136.
1.01	7.05	85	.07	.04	.03	65.	1.01	19.05	229	.02	.02	.00	127.
1.01	7.10	86	.07	.04	.03	67.	1.01	19.10	230	.02	.02	.00	118.
1.01	7.15	87	.07	.04	.03	69.	1.01	19.15	231	.02	.02	.00	110.
1.01	7.20	88	.07	.04	.02	71.	1.01	19.20	232	.02	.02	.00	103.
1.01	7.25	89	.07	.04	.02	73.	1.01	19.25	233	.02	.02	.00	96.
1.01	7.30	90	.07	.04	.02	74.	1.01	19.30	234	.02	.02	.00	90.
1.01	7.35	91	.07	.04	.02	76.	1.01	19.35	235	.02	.02	.00	84.
1.01	7.40	92	.07	.04	.02	77.	1.01	19.40	236	.02	.02	.00	78.
1.01	7.45	93	.07	.04	.02	79.	1.01	19.45	237	.02	.02	.00	73.
1.01	7.50	94	.07	.04	.02	80.	1.01	19.50	238	.02	.02	.00	68.
1.01	7.55	95	.07	.05	.02	81.	1.01	19.55	239	.02	.02	.00	63.
1.01	8.00	96	.07	.05	.02	83.	1.01	20.00	240	.02	.02	.00	59.
1.01	8.05	97	.07	.05	.02	84.	1.01	20.05	241	.02	.02	.00	55.
1.01	8.10	98	.07	.05	.02	85.	1.01	20.10	242	.02	.02	.00	51.
1.01	8.15	99	.07	.05	.02	86.	1.01	20.15	243	.02	.02	.00	48.
1.01	8.20	100	.07	.05	.02	87.	1.01	20.20	244	.02	.02	.00	45.
1.01	8.25	101	.07	.05	.02	88.	1.01	20.25	245	.02	.02	.00	42.
1.01	8.30	102	.07	.05	.02	89.	1.01	20.30	246	.02	.02	.00	39.
1.01	8.35	103	.07	.05	.02	90.	1.01	20.35	247	.02	.02	.00	38.
1.01	8.40	104	.07	.05	.02	90.	1.01	20.40	248	.02	.02	.00	38.
1.01	8.45	105	.07	.05	.02	91.	1.01	20.45	249	.02	.02	.00	38.
1.01	8.50	106	.07	.05	.01	92.	1.01	20.50	250	.02	.02	.00	38.
1.01	8.55	107	.07	.05	.01	93.	1.01	20.55	251	.02	.02	.00	38.
1.01	9.00	108	.07	.05	.01	94.	1.01	21.00	252	.02	.02	.00	38.
1.01	9.05	109	.07	.05	.01	94.	1.01	21.05	253	.02	.02	.00	38.
1.01	9.10	110	.07	.05	.01	95.	1.01	21.10	254	.02	.02	.00	38.
1.01	9.15	111	.07	.05	.01	96.	1.01	21.15	255	.02	.02	.00	38.
1.01	9.20	112	.07	.05	.01	96.	1.01	21.20	256	.02	.02	.00	38.
1.01	9.25	113	.07	.05	.01	97.	1.01	21.25	257	.02	.02	.00	38.
1.01	9.30	114	.07	.05	.01	97.	1.01	21.30	258	.02	.02	.00	38.
1.01	9.35	115	.07	.05	.01	98.	1.01	21.35	259	.02	.02	.00	38.
1.01	9.40	116	.07	.05	.01	99.	1.01	21.40	260	.02	.02	.00	38.
1.01	9.45	117	.07	.05	.01	99.	1.01	21.45	261	.02	.02	.00	38.
1.01	9.50	118	.07	.05	.01	100.	1.01	21.50	262	.02	.02	.00	38.
1.01	9.55	119	.07	.05	.01	100.	1.01	21.55	263	.02	.02	.00	38.
1.01	10.00	120	.07	.05	.01	101.	1.01	22.00	264	.02	.02	.00	38.

TABLE A-1
Sheet 4 of 5

1.01	10.05	121	.07	.06	.01	101.	1.01	22.05	265	.02	.02	.00	38.
1.01	10.10	122	.07	.06	.01	101.	1.01	22.10	266	.02	.02	.00	38.
1.01	10.15	123	.07	.06	.01	102.	1.01	22.15	267	.02	.02	.00	38.
1.01	10.20	124	.07	.06	.01	102.	1.01	22.20	268	.02	.02	.00	38.
1.01	10.25	125	.07	.06	.01	103.	1.01	22.25	269	.02	.02	.00	38.
1.01	10.30	126	.07	.06	.01	103.	1.01	22.30	270	.02	.02	.00	38.
1.01	10.35	127	.07	.06	.01	103.	1.01	22.35	271	.02	.02	.00	38.
1.01	10.40	128	.07	.06	.01	104.	1.01	22.40	272	.02	.02	.00	38.
1.01	10.45	129	.07	.06	.01	104.	1.01	22.45	273	.02	.02	.00	38.
1.01	10.50	130	.07	.06	.01	105.	1.01	22.50	274	.02	.02	.00	38.
1.01	10.55	131	.07	.06	.01	105.	1.01	22.55	275	.02	.02	.00	38.
1.01	11.00	132	.07	.06	.01	105.	1.01	23.00	276	.02	.02	.00	38.
1.01	11.05	133	.07	.06	.01	105.	1.01	23.05	277	.02	.02	.00	38.
1.01	11.10	134	.07	.06	.01	106.	1.01	23.10	278	.02	.02	.00	38.
1.01	11.15	135	.07	.06	.01	106.	1.01	23.15	279	.02	.02	.00	38.
1.01	11.20	136	.07	.06	.01	106.	1.01	23.20	280	.02	.02	.00	38.
1.01	11.25	137	.07	.06	.01	107.	1.01	23.25	281	.02	.02	.00	38.
1.01	11.30	138	.07	.06	.01	107.	1.01	23.30	282	.02	.02	.00	38.
1.01	11.35	139	.07	.06	.01	107.	1.01	23.35	283	.02	.02	.00	38.
1.01	11.40	140	.07	.06	.01	107.	1.01	23.40	284	.02	.02	.00	38.
1.01	11.45	141	.07	.06	.01	108.	1.01	23.45	285	.02	.02	.00	38.
1.01	11.50	142	.07	.06	.01	108.	1.01	23.50	286	.02	.02	.00	38.
1.01	11.55	143	.07	.06	.01	108.	1.01	23.55	287	.02	.02	.00	38.
1.01	12.00	144	.07	.06	.01	108.	1.02	0.00	288	.02	.02	.00	38.
									SUM	32.24	29.51	2.73	56465.
										(819.)	(749.)	(69.)	(1598.91)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2605.	625.	196.	196.	56443.
CMS	74.	18.	6.	6.	1598.
INCHES		24.21	30.39	30.39	30.39
MM		614.96	771.78	771.78	771.78
AC-FT		310.	389.	389.	389.
THOUS CU M		382.	479.	479.	479.

TABLE A-1
Sheet 5 of 5

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	114.10	114.10	116.40
STORAGE	83.	83.	101.
OUTFLOW	0.	0.	276.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.10	115.72	0.00	95.	131.	0.00	16.00	0.00
.15	116.17	0.00	99.	222.	0.00	16.00	0.00
.20	116.55	.15	102.	315.	.42	16.00	0.00
.25	116.85	.45	104.	435.	.67	15.92	0.00
.30	117.08	.68	106.	575.	.83	15.92	0.00
.35	117.24	.84	107.	712.	1.00	15.92	0.00
.40	117.40	1.00	109.	860.	1.17	15.83	0.00
.50	117.64	1.24	111.	1163.	1.83	15.83	0.00
1.00	118.33	1.93	117.	2457.	5.75	15.83	0.00

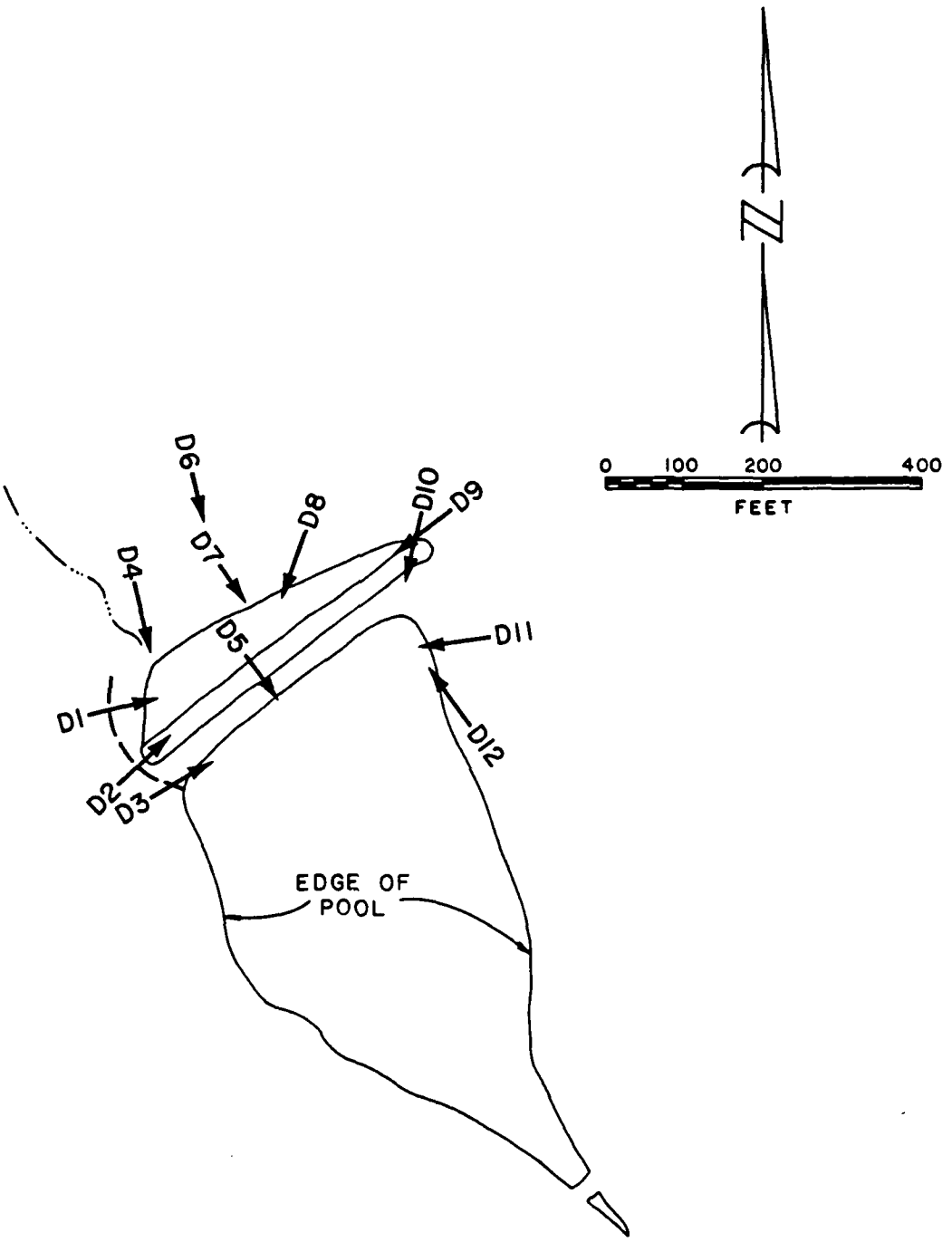
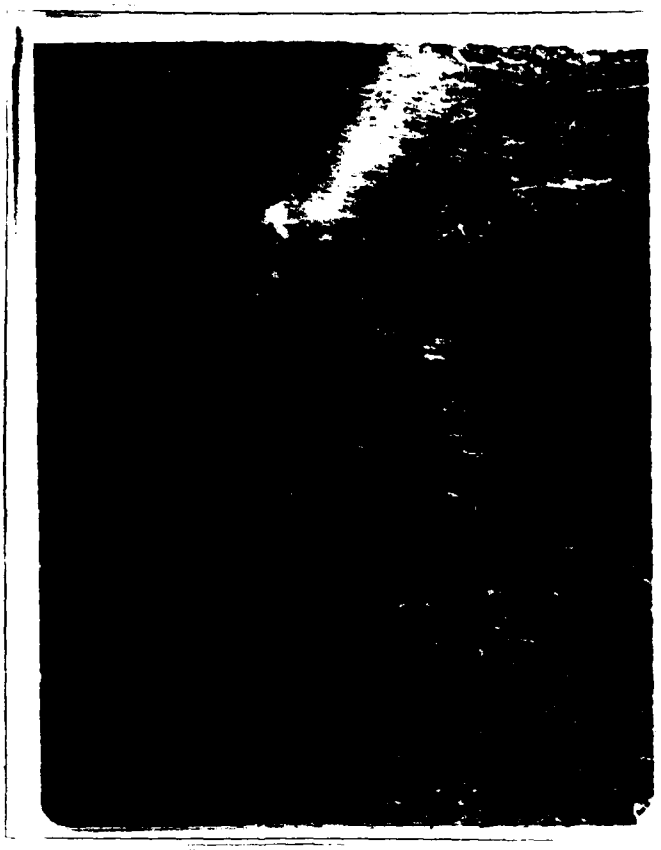
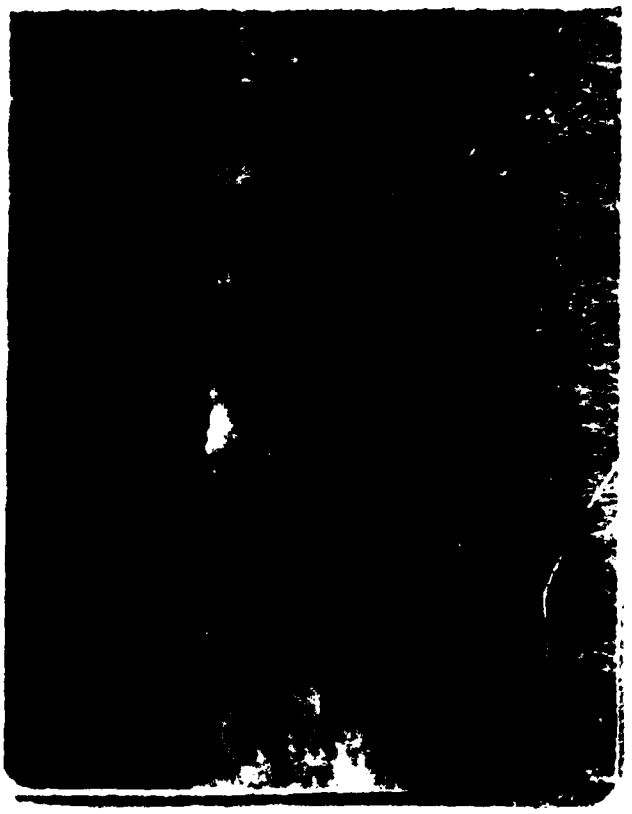


PHOTO INDEX I
FOR
DAM

PAUL GOESSLING
ST. LOUIS COUNTY, MO.
OCTOBER 1978

PREPARED BY
REITZ & JENS, INC.

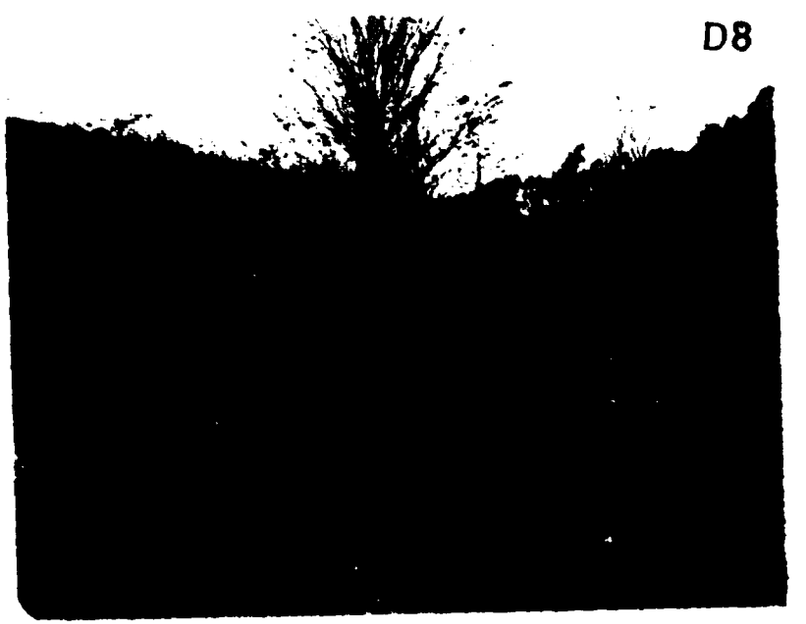




DAMIM

D6

D8



DAM

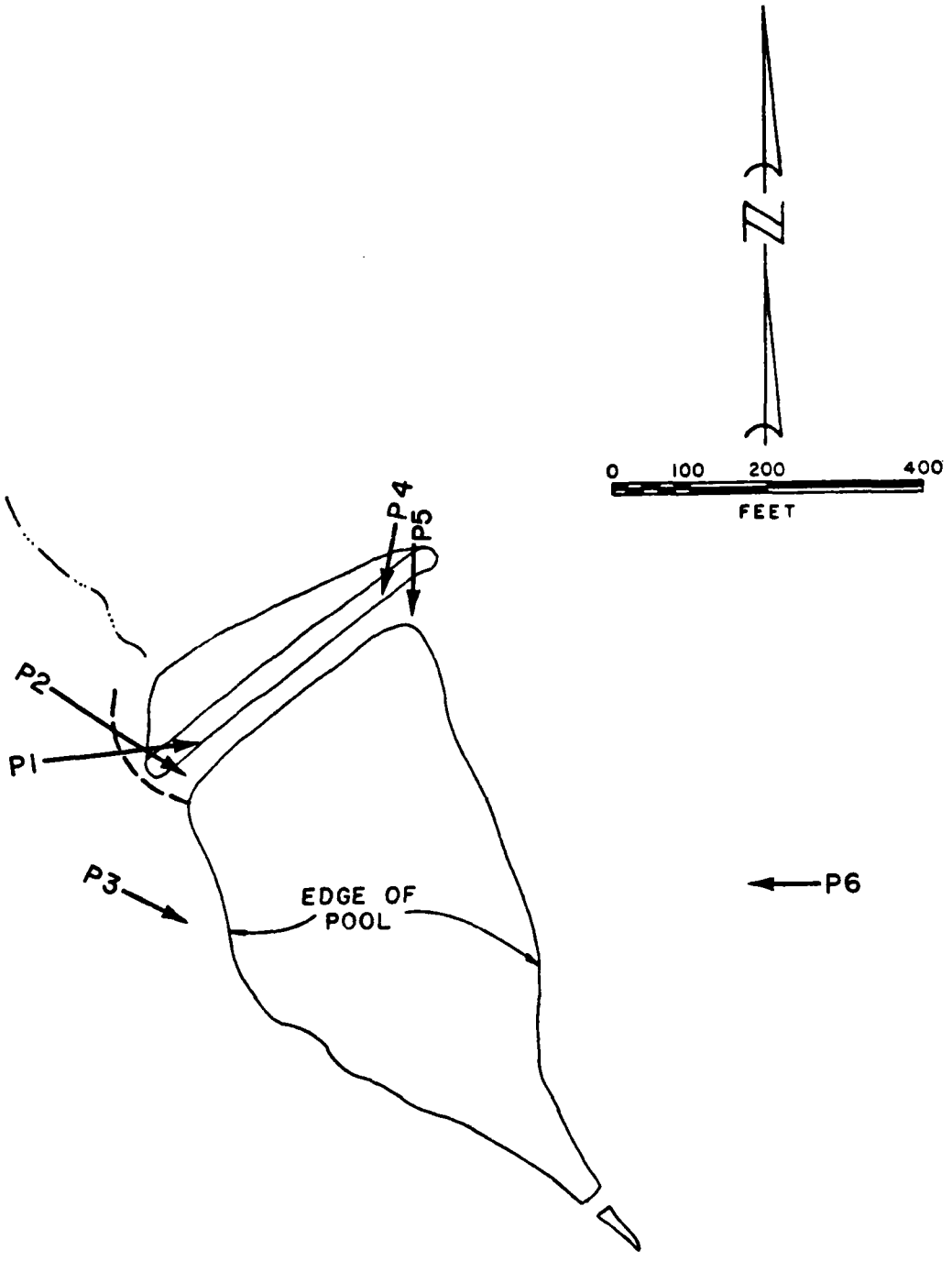
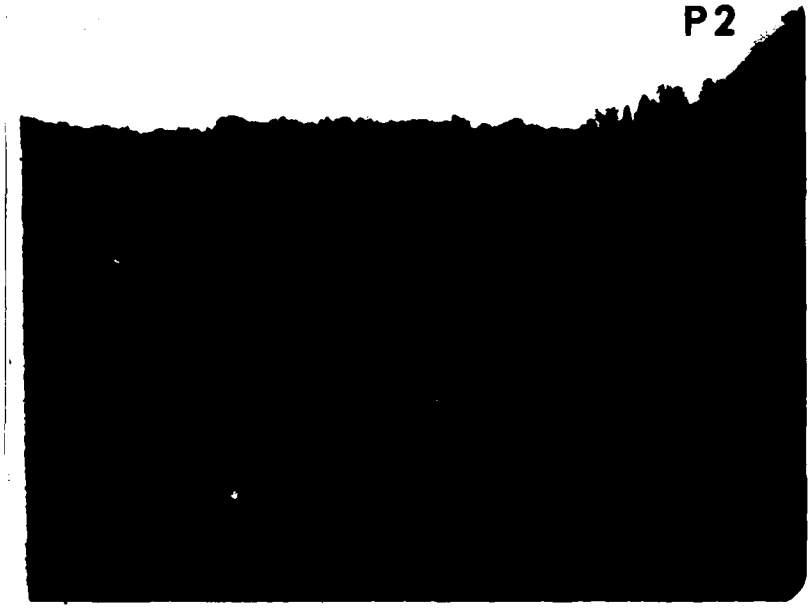
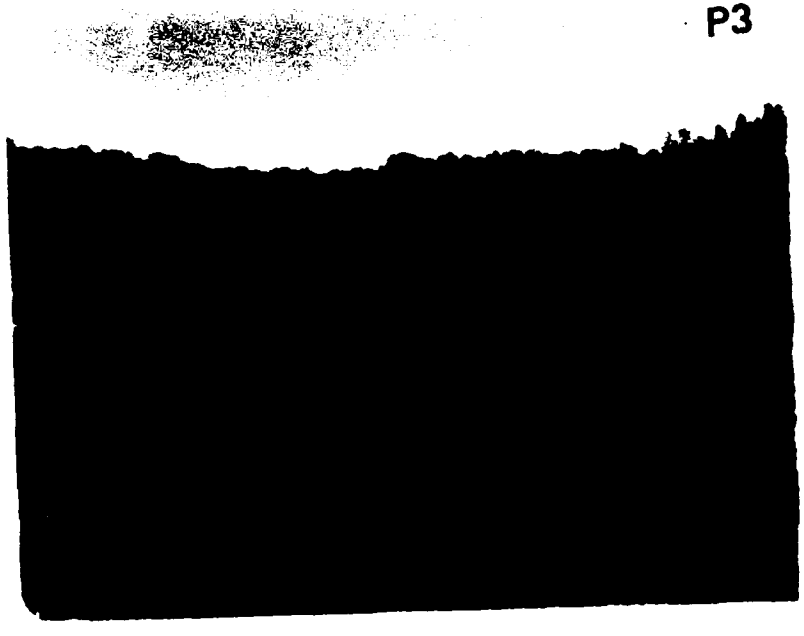


PHOTO INDEX 2
FOR
PANORAMA

PAUL GOESSLING
ST. LOUIS COUNTY, MO.
OCTOBER 1978

PREPARED BY
REITZ & JENS, INC.





PANORAMA


P5

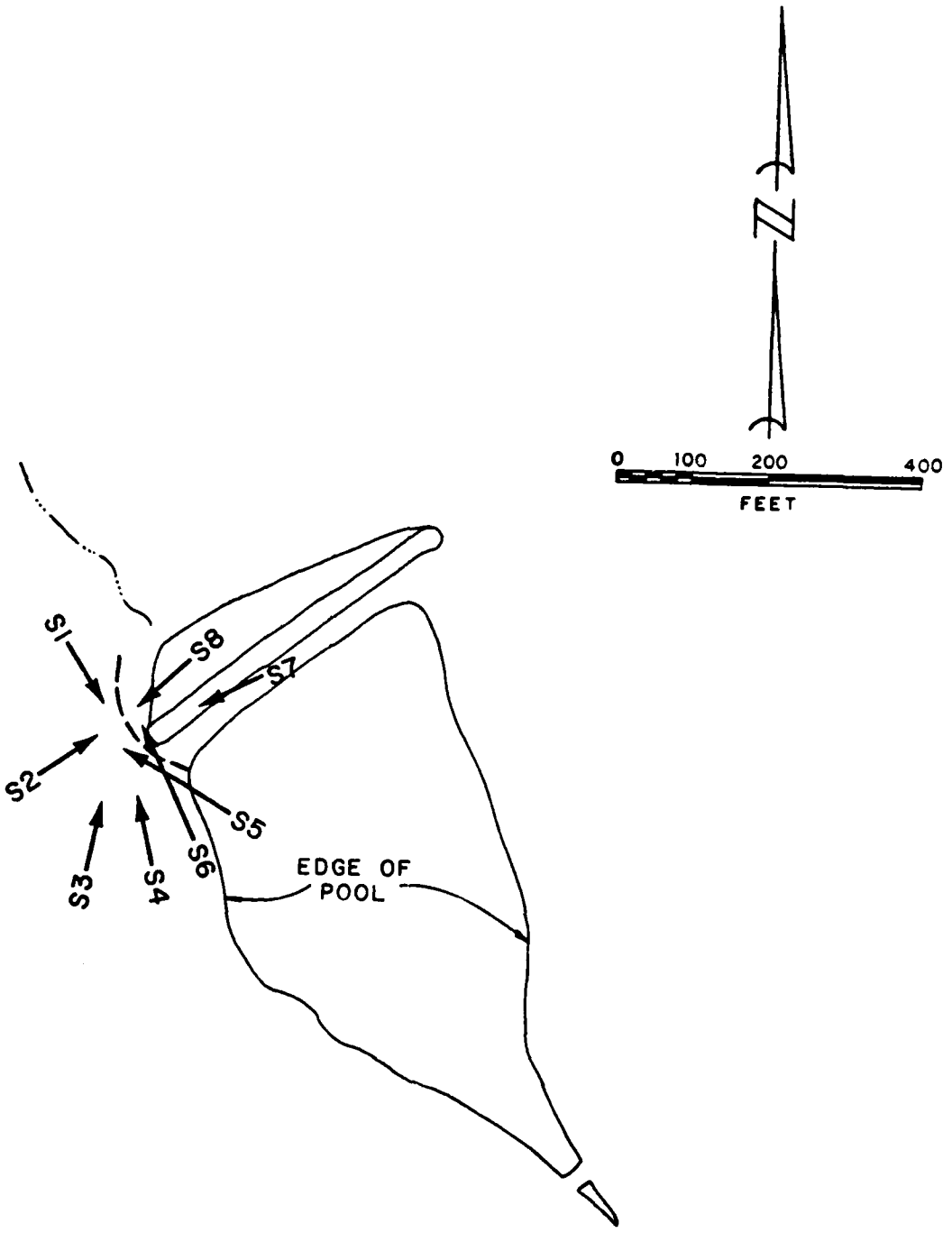
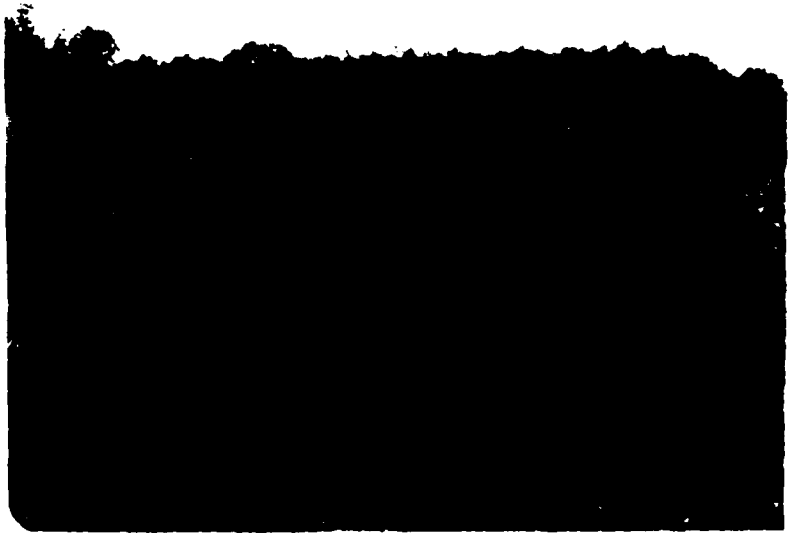


PHOTO INDEX 3
FOR
SPILLWAY

PAUL GOESSLING
ST. LOUIS COUNTY, MO.
OCTOBER 1978

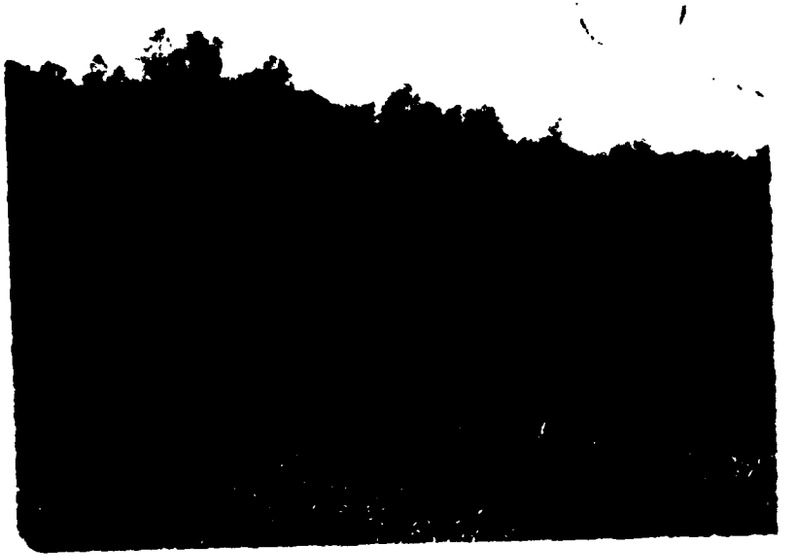
PREPARED BY
REITZ & JENS, INC.



SPILLWAYS


S5


S6


S7


S8

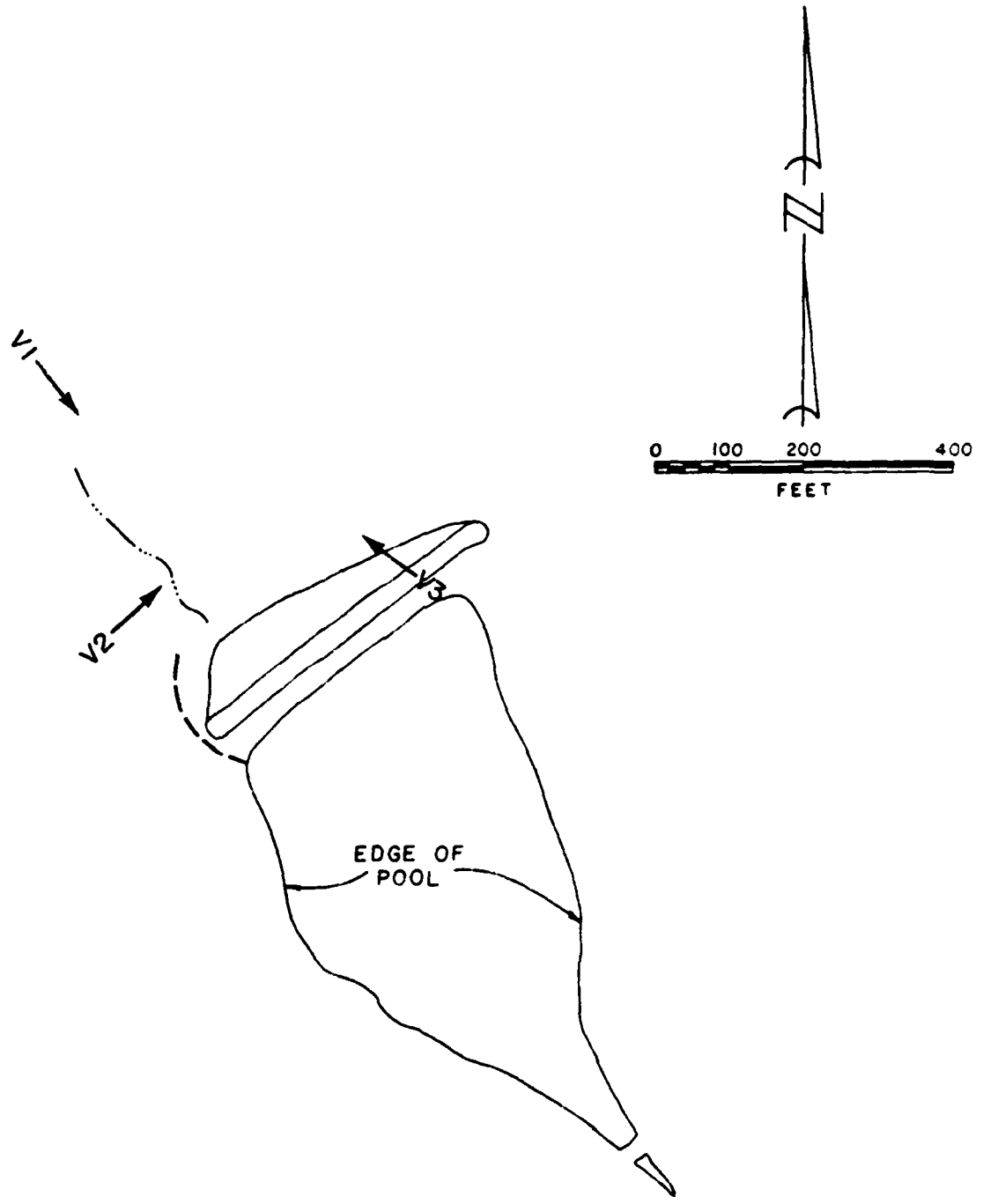
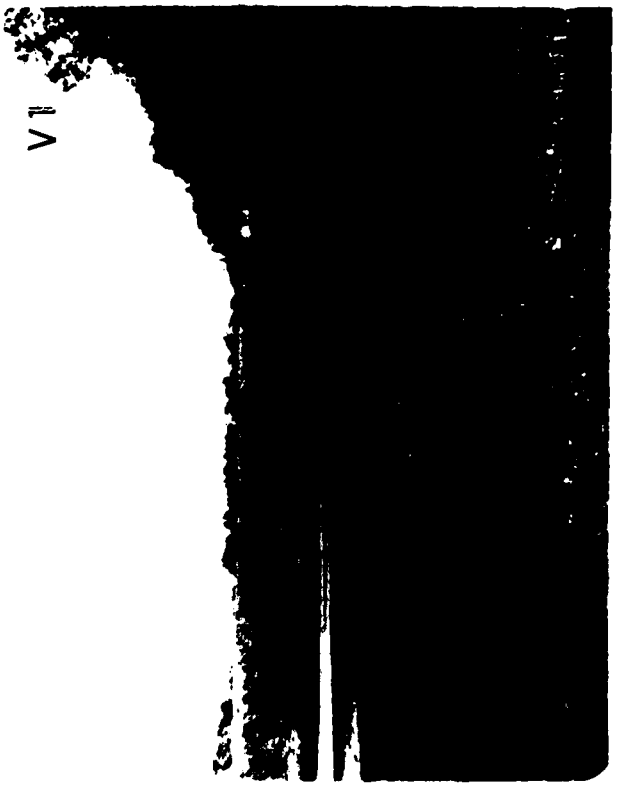
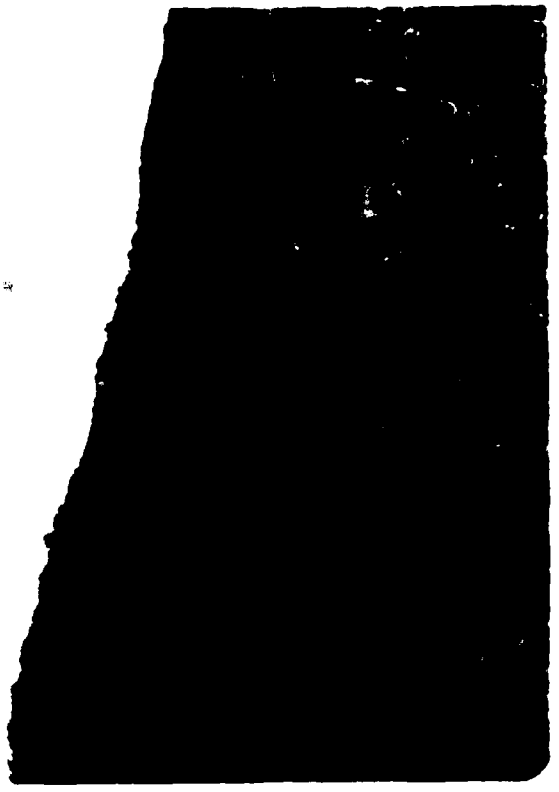


PHOTO INDEX 4
FOR
VALLEY BELOW DAM

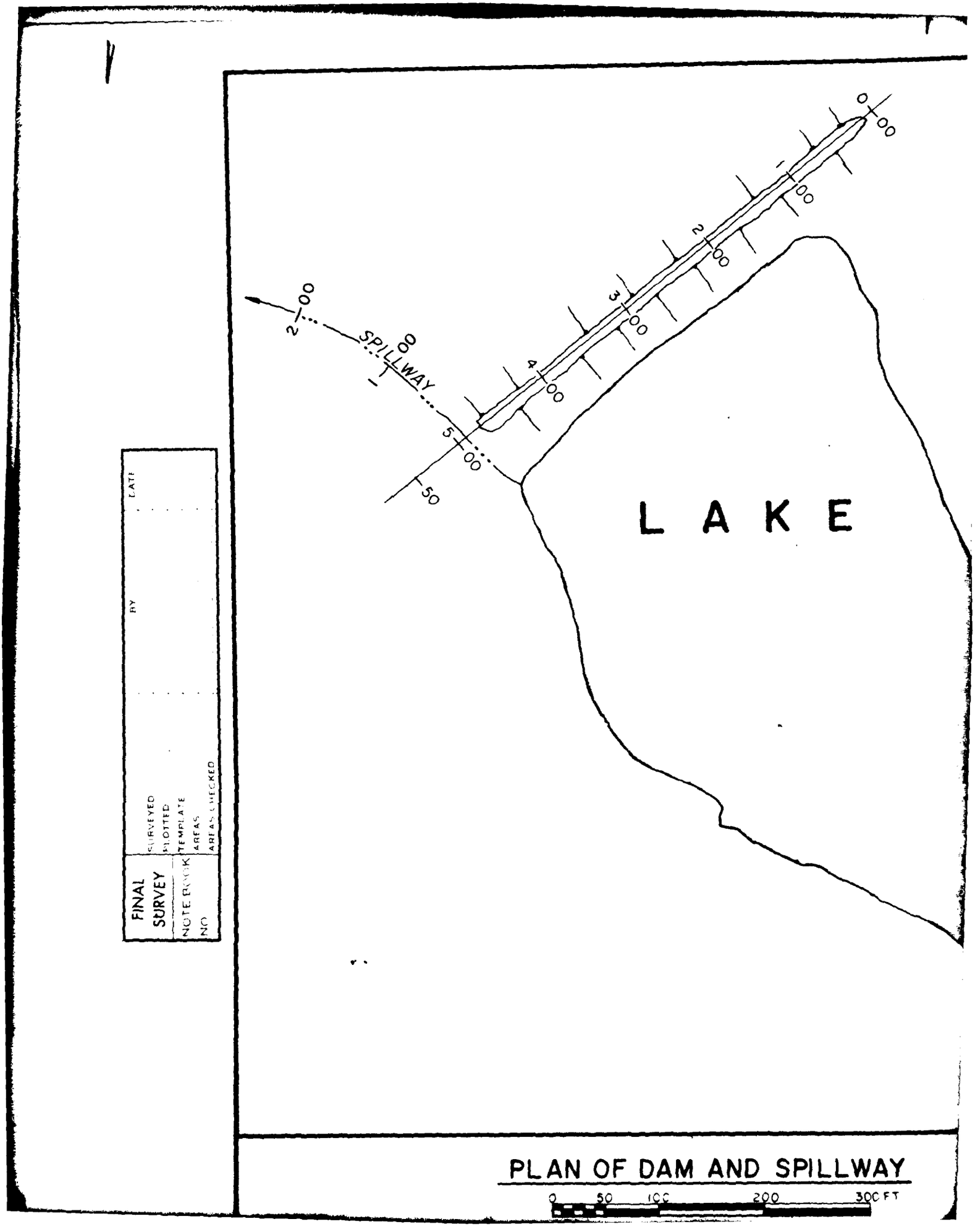
PAUL GOESSLING
ST. LOUIS COUNTY, MO.
OCTOBER 1978

PREPARED BY
REITZ & JENS, INC.

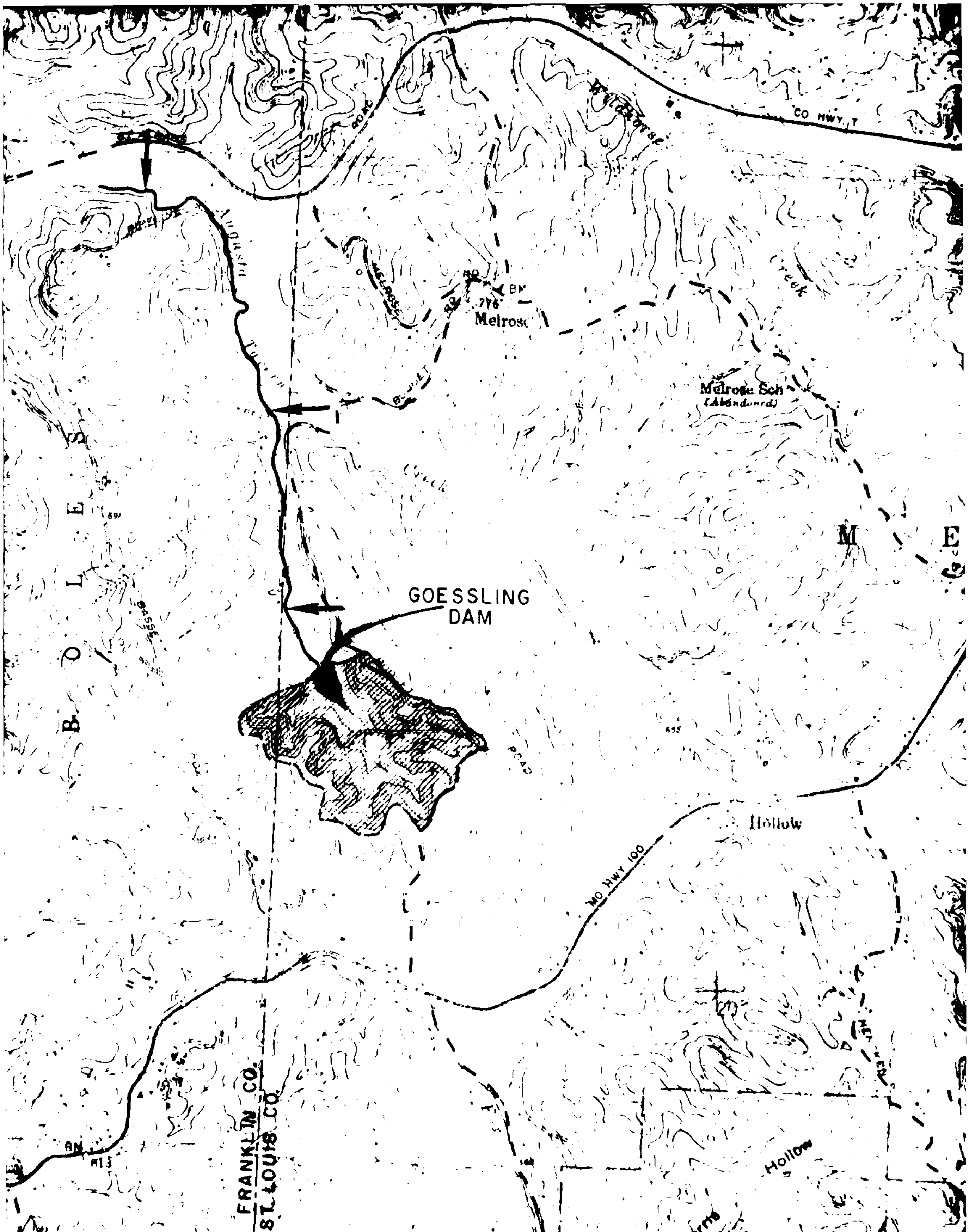


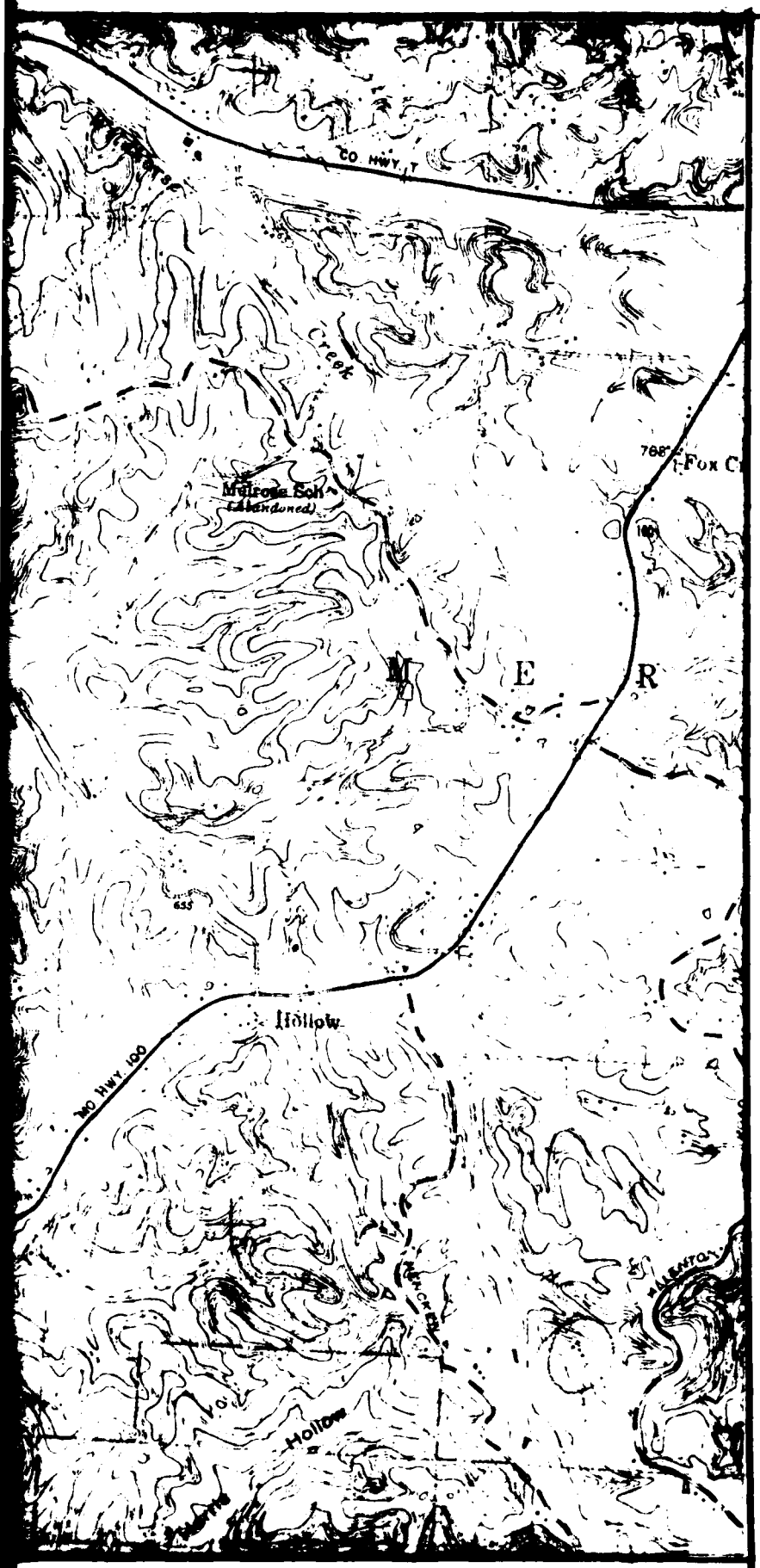


VALLEY BELOW DAM


0+00
1+00
2+00
3+00
4+00
5+00
SPILLWAY
2+00
50
LAKE
FINAL SURVEY
NOTE BOOK NO
SURVEYED
PLOTTED
TEMPLATE
AREAS
AREAS CHECKED
BY
DATE
PLAN OF DAM AND SPILLWAY
0 50 100 200 300 FT

Z
Z
PLAN
0
100

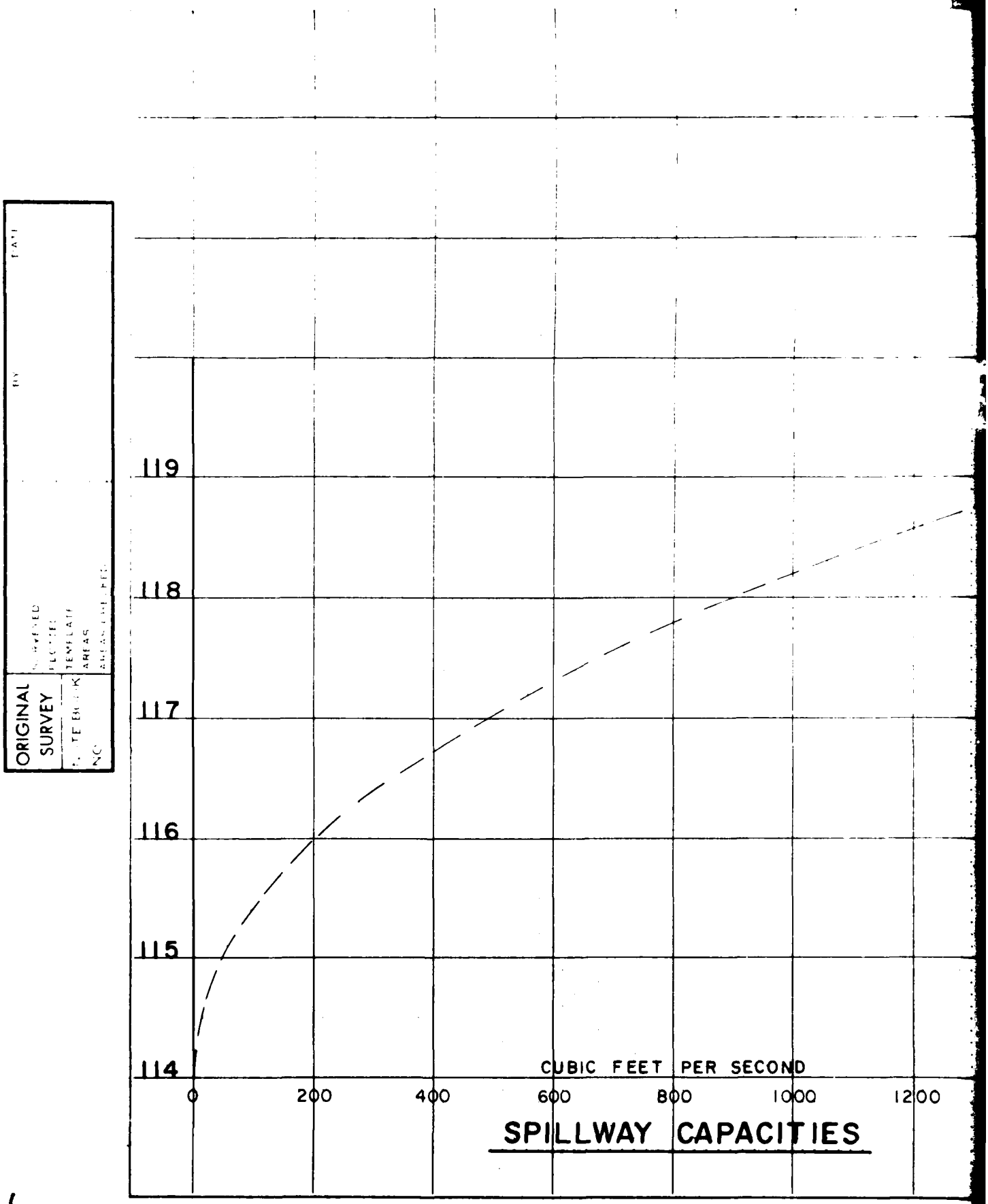

GOESSLING
DAM
CO HWY T
Melrose
Melrose Sch
(Abandoned)
Creek
M
E
B
O
L
E
Hollow
MO HWY 100
FRANKLIN CO.
ST. LOUIS CO.
BM
Hollow



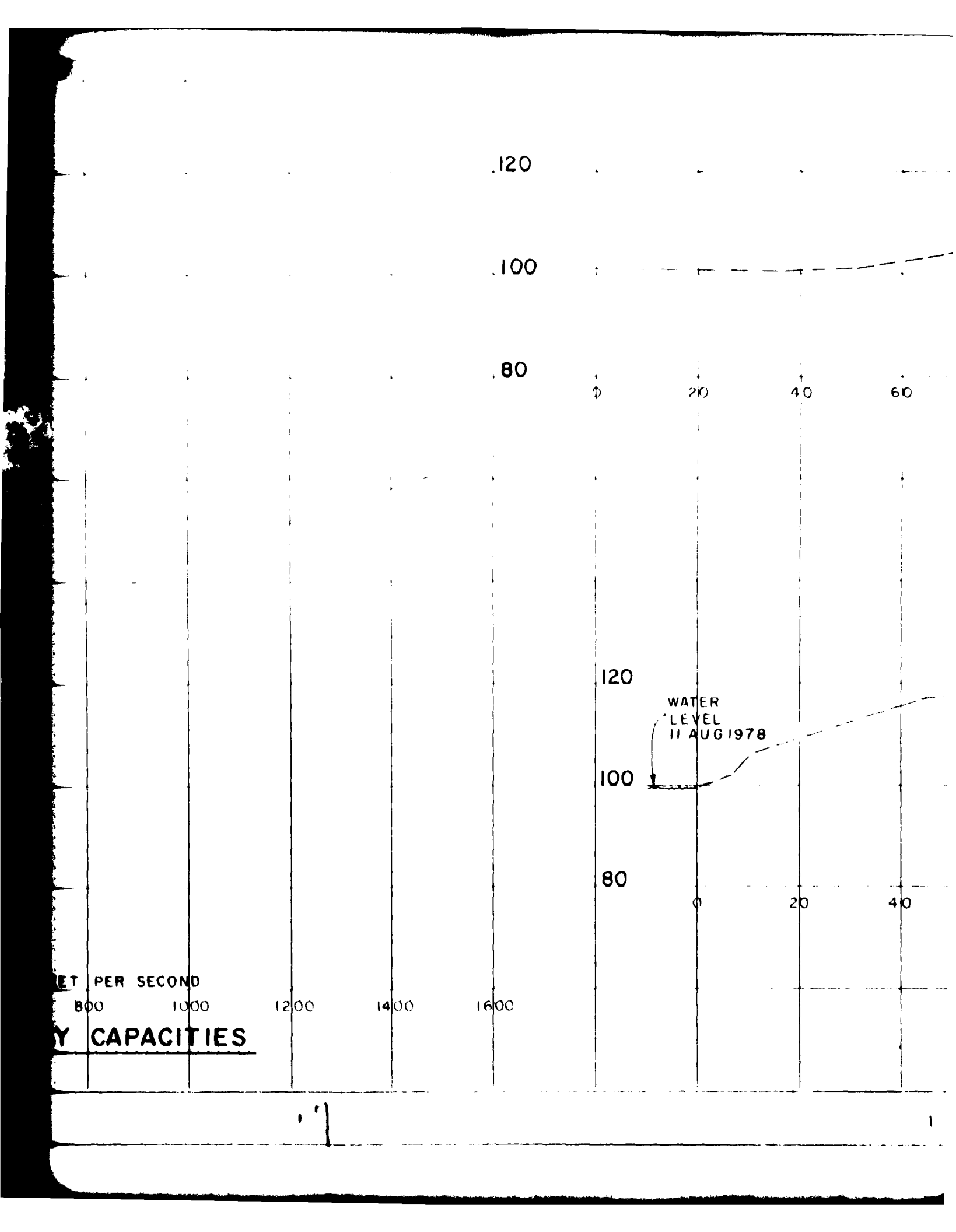
N

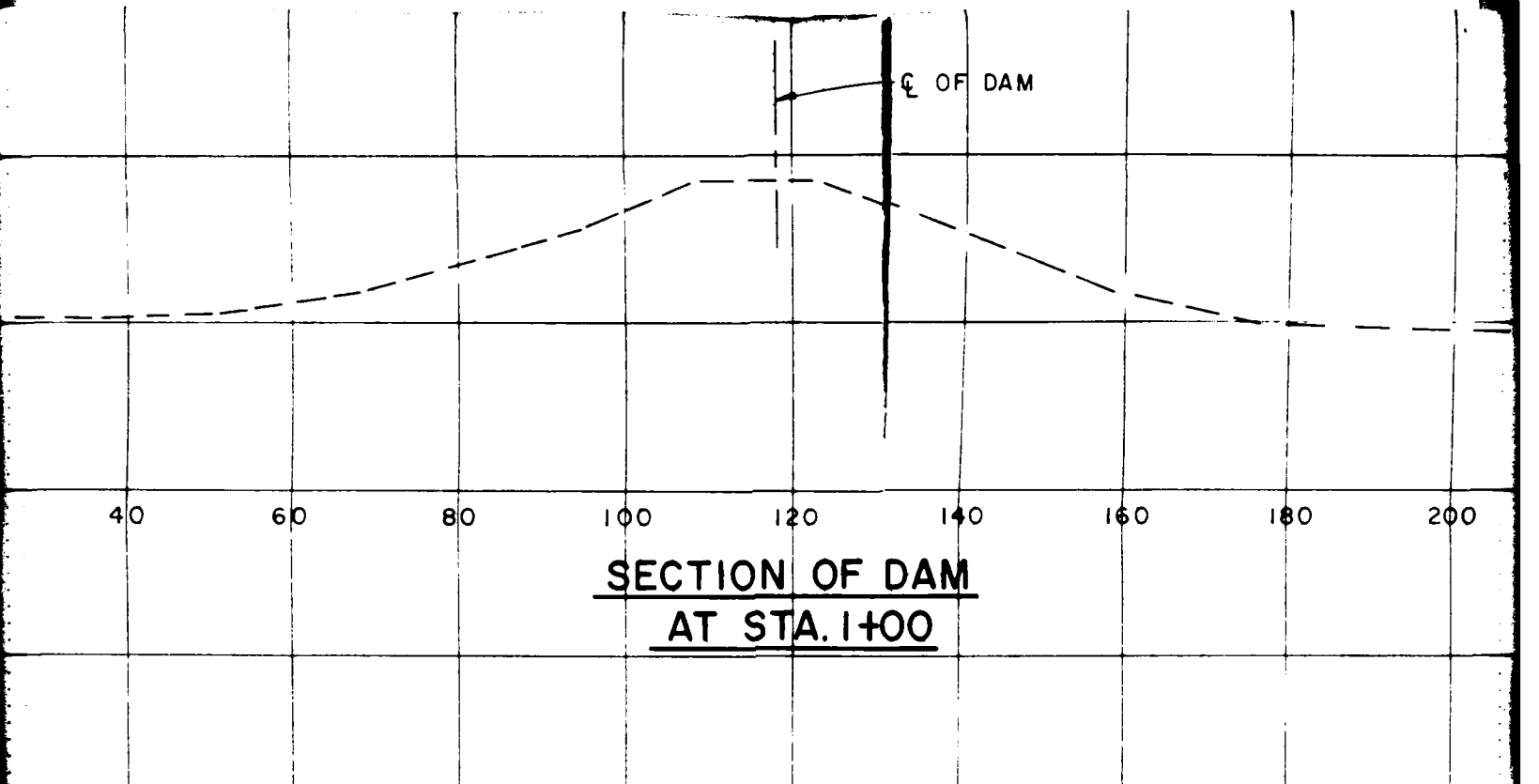
OUTFLOW CHANNEL

4000 6000 FT.

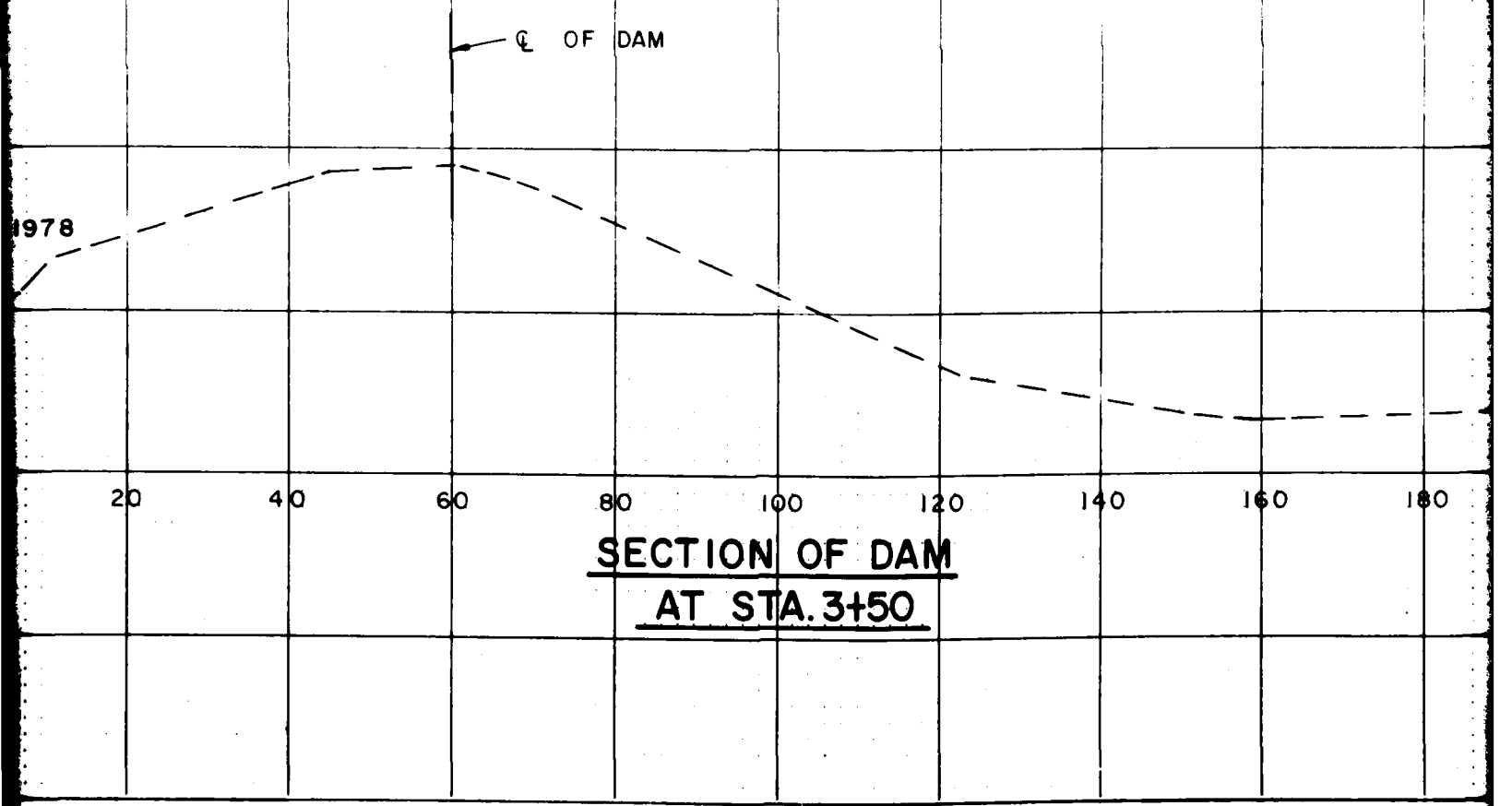

ORIGINAL SURVEY
119
118
117
116
115
114
0
200
400
600
800
1000
1200
CUBIC FEET PER SECOND
SPILLWAY CAPACITIES

6


120
100
80
0
20
40
60
120
WATER
LEVEL
11 AUG 1978
100
80
0
20
40
ET PER SECOND
800
1000
1200
1400
1600
Y CAPACITIES

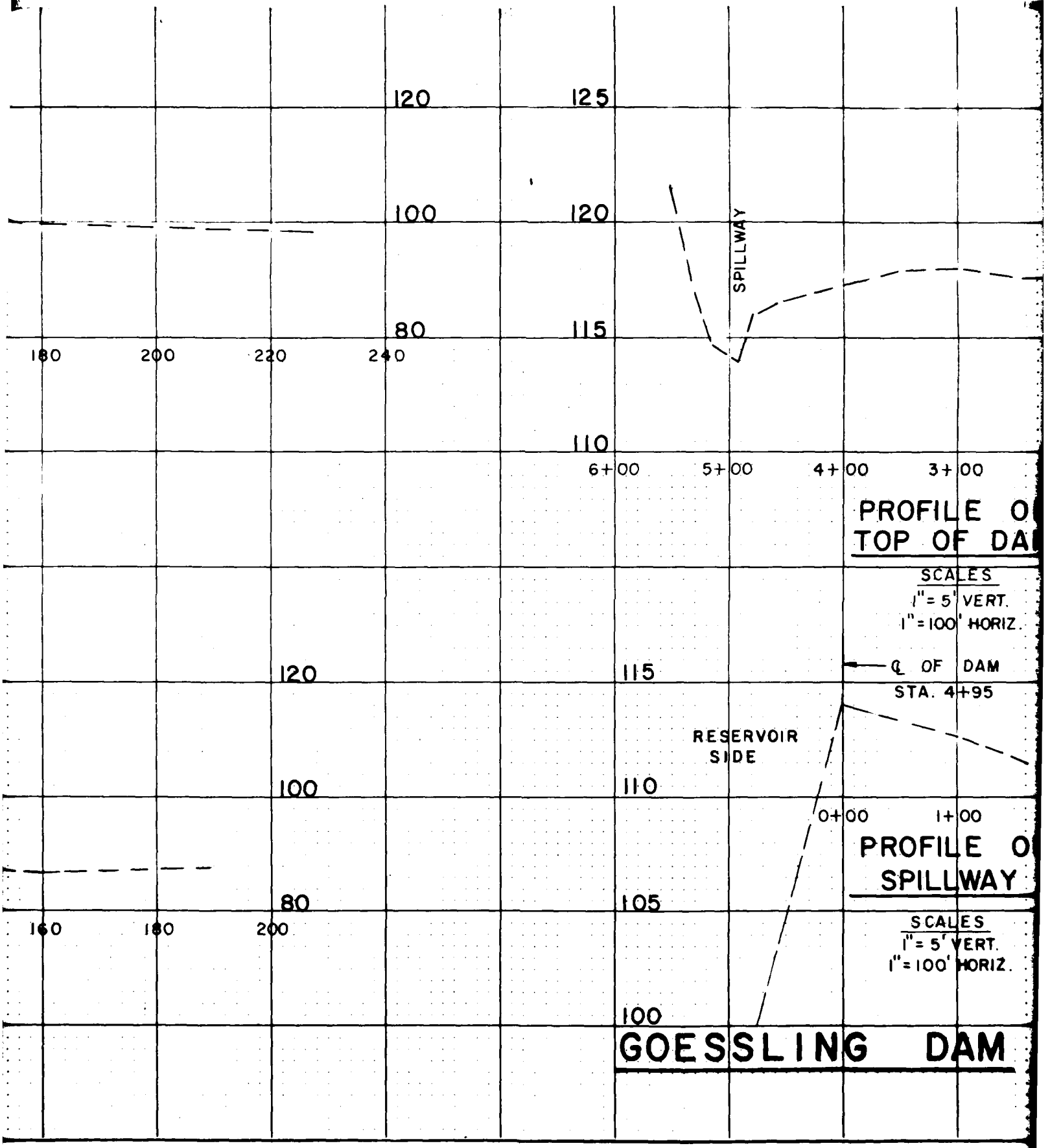


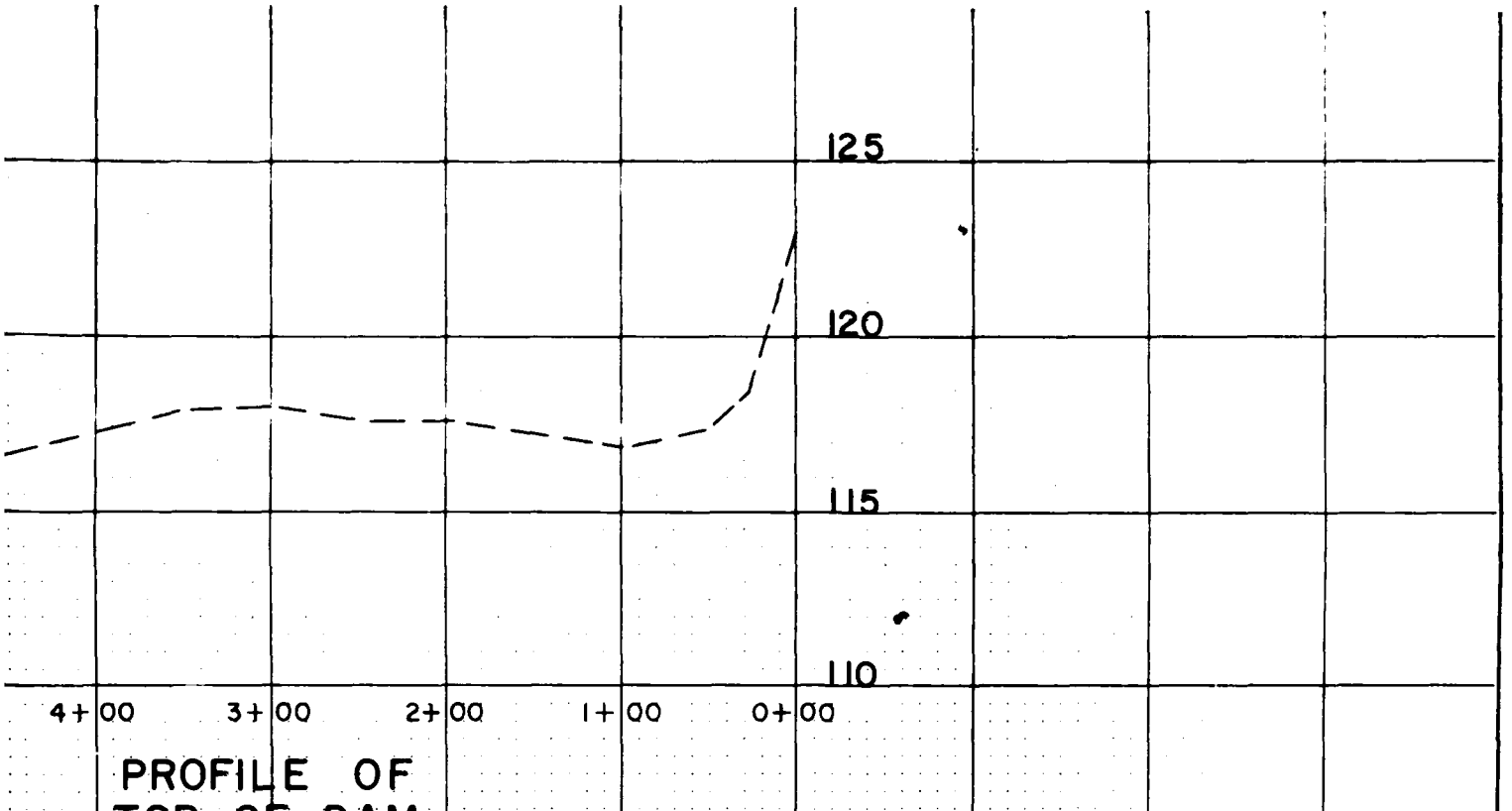
SECTION OF DAM AT STA. 1+00



SECTION OF DAM AT STA. 3+50

HIGHWAY FEDERAL AID SHEET
PLATE 4-SINGLE PLAN AND CROSS SECTION-LINE & DOT
TELEDYNE NATIONAL TRACING PAPER
INDIANAPOLIS, INDIANA PRINTED IN U.S.A.

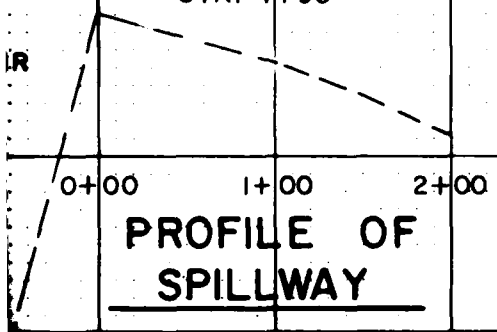

120
100
80
180
200
220
240
125
120
115
110
SPILLWAY
6+00
5+00
4+00
3+00
PROFILE O
TOP OF DA
SCALES
1"= 5' VERT.
1"= 100' HORIZ.
℄ OF DAM
STA. 4+95
120
100
80
160
180
200
115
110
105
100
RESERVOIR
SIDE
0+00
1+00
PROFILE O
SPILLWAY
SCALES
1"= 5' VERT.
1"= 100' HORIZ.
GOESSLING DAM



PROFILE OF TOP OF DAM

SCALES
1" = 5' VERT.
1" = 100' HORIZ.

℄ OF DAM
STA. 4+95



PROFILE OF SPILLWAY

SCALES
1" = 5' VERT.
1" = 100' HORIZ.

ADD 515' TO ELEVATIONS SHOWN TO OBTAIN APPROXIMATE U.S.G.S. DATUM

ING DAM

PHASE I – INSPECTION
COUNTY I.D. NO. 189
ST. LOUIS COUNTY, MISSOURI

INVENTORY NO. I. D. 30852

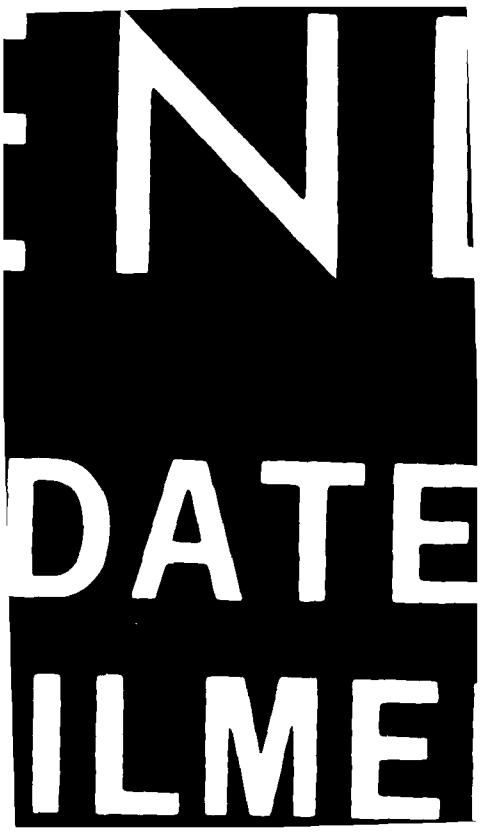
FOR ST. LOUIS DISTRICT, CORPS OF ENGINEERS

REITZ & JENS, INC.
CONSULTING ENGINEERS

ST. LOUIS, MISSOURI
NOVEMBER 1978

110

PLATE 3


N
DATE
ILME